

**CASUALTY INSURANCE:
AIRPOWER'S DOUBLE INDEMNITY**

**BY
SEAN P. CULLEN**

**A THESIS PRESENTED TO THE FACULTY OF
THE SCHOOL OF ADVANCED AIR AND SPACE STUDIES
FOR COMPLETION OF GRADUATION REQUIREMENTS**

**SCHOOL OF ADVANCED AIR AND SPACE STUDIES
AIR UNIVERSITY
MAXWELL AIR FORCE BASE, ALABAMA**

JUNE 2017

DISCLAIMER

The conclusions and opinions expressed in this document are those of the author. They do not reflect the official position of the US Government, Department of Defense, the United States Air Force, or Air University.



ABOUT THE AUTHOR

Major Sean P. Cullen graduated from East Carolina University in 2003. He is a senior Air Battle Manager with over 1700 hours in the E-8 JSTARS and E-3 AWACS. He has served in a variety of positions at the squadron and group level including Flight Commander, Executive Officer, and Assistant Director of Operations. Major Cullen has flown 88 combat missions as an Air Weapons Officer and Surveillance Officer in support of operations IRAQI and ENDURING FREEDOM. He represented the Air Battle Management community as a liaison officer in the CENTCOM and PACOM Theater Combined Air and Space Operations Centers, working in Combat Operations and Combat Plans Divisions.



ACKNOWLEDGMENTS

I would like to express my sincere thanks to several people who have been vital to this study. First and foremost, Dr. Stephen Chiabotti for his comments and suggestions in the preparation of this document. He has substantially contributed to this work, and his efforts have greatly strengthened the final product. Dr. Thomas Hughes, for his insights and airpower discussions that aided in the refining of this thesis. Any mistakes or omissions are, however, solely the responsibility of the author.

I would also like to express my appreciation to the SAASS faculty and my fellow classmates. Their support through this year of study and research was invaluable. In addition, a special appreciation for every service member who has contributed to the development of the officer I am today.

Most importantly, I would like to thank my family. Thank you for supporting me during my year at SAASS and allowing me to go on this academic journey. Their patience, support, and understanding has carried me through this challenging year. They continue to make all the difference in ensuring my success. I love you all more than you will ever know.



ABSTRACT

From Sun Tzu to Carl von Clausewitz, many theorists have attempted to explain the intricacies of war so that it could be fought and won efficiently. From its origins, airpower was believed to make war more humane through its inherent ability to attack quickly and discriminately, ultimately leading to fewer casualties. Following Clausewitz's trinity of violence, uncertainty, and logic, this thesis suggests that war's nature and the requirement for efficiency in conflict influences airpower innovation. This thesis proposes that the logic of self-preservation and casualty-aversion has driven airpower innovation since the end of the Vietnam conflict. Specifically, technological and doctrinal innovation progressed through growing societal, political, and military pressures to avoid casualties as a result of the Vietnam experience. Additionally, this logic has produced instances of interservice competition between the U.S. Army and Air Force over who can provide the most cost-efficient way to achieve success in a strategic environment that lacks a significant near-peer adversary. This paper shows how these elements have directly influenced the evolution of the Air Force from a service focused on mass to one emphasizing accuracy through the development of technologies and doctrines that concentrate on standoff, precision, and stealth capabilities. The strategic dilemma, however, is that as the Air Force becomes more precise, the enemy has adapted and attempted to offset these capabilities by fighting war unconventionally to influence public opinion by inducing casualties. Utilizing historical analysis to detail the evolution of airpower from the end of the Vietnam War to Iraqi Freedom, this thesis suggests that we will continue to see Air Force innovations, influenced by external and internal pressures, which focus on increasing friendly survivability and decreasing enemy casualties.

CONTENTS

Chapter	Page
DISCLAIMER	ii
ABOUT THE AUTHOR	iii
ACKNOWLEDGMENTS	iv
ABSTRACT	v
INTRODUCTION	1
1 DESERT STORM: AIRPOWER'S SECOND EVOLUTION	12
2 THE NEW WAY OF WAR: U.S. AIRPOWER IN THE BALKANS .	36
3 ENDURING FREEDOM: THE FIRST AMERICAN WAR OF THE 21ST CENTURY	52
4 IRAQI FREEDOM: FROM OVERWHELMING FORCE TO OVERMATCHING POWER	65
SUMMARY and RECOMMENDATIONS	81
BIBLIOGRAPHY	90

Illustrations

Figure

1	U.S. Fatalities in the Vietnam War	18
2	U.S. Support For Vietnam War	19
3	Casualties Since WWII	87



Introduction

The Air Force's ability to continue to adapt and respond faster than our potential adversaries is the greatest challenge we face over the next 30 years.

*General Mark A. Welsh III
20th Chief of Staff of the U.S. Air Force*

The United States Air Force (USAF) has faced many significant challenges and changes in the security environment throughout its history. Each has driven the direction of its capabilities. The 21st century's national-security issues in the air, space, and cyber domains have created the need to address novel challenges while setting a course that prepares the USAF for the future. Currently, the U.S. faces Islamic extremism that threatens the world daily with operatives in Iraq, Syria, and other countries around the world. Current U.S. intelligence reports declare evidence of Russian cyber hacking designed to influence the U.S. elections. Meanwhile, China has successfully completed hypersonic missile tests. These are just a few examples of the security challenges the USAF faces today. So how does the USAF meet the challenges of the changing security environment today while casting an eye towards the future?

Innovation is a key mechanism that guides the USAF and other military institutions. Innovation is an idea or technology that creates a positive change from the current way of doing things. It is not limited to new ideas or technologies; innovation could also include grouping existing means together to form a better way of doing things. More specifically, innovation is some form of ingenuity that solves current and potential problems. The USAF has used and currently uses different forms of innovation to overcome a variety of security challenges. In order for the USAF to maintain its current advantage, it must be able to innovate and adapt to change better than its enemies. In sum, the USAF must use innovation to meet the numerous changes in the security environment or risk degenerating into irrelevancy.

This work revolves around the following questions:

- Does the USAF innovate effectively in response to change?

- How does the USAF innovate?
- What motivates innovation in the USAF? Why?
- How might an analysis of USAF innovations from Desert Storm to Iraqi Freedom provide insight to the understanding of current and future innovations?
- Are there any secondary or tertiary effects of innovations that caused change in the security environment, leading to a further requirement to innovate?
- Is it possible to develop an unbiased, systematic, and legitimate prediction for the path of innovation based on recent historical trends?

The answers to these questions are relevant for current and future USAF leaders who will make decisions affecting the way the USAF organizes, trains, and equips for the 'next war'. The modern battlefield, whether dealing with the rapid conventional advance on Baghdad in March 2003, or the endless insurgencies that followed, presents the uncertainties that have always characterized war. How to make sensible innovations in a world dominated by uncertainty is the issue the USAF as an institution, no matter how sophisticated its technology, faces and will continue to face for as long as the U.S. fights wars. If the USAF wants to ensure its global dominance, it must be able to adapt to change better than its adversaries. In order to do this effectively and efficiently, it is important to understand what stimulates innovation in the USAF. While the past does not paint a definitive picture of the future, it can provide insight to inform the decisions of future USAF leaders.

This paper will take an impartial look at the USAF's technological and doctrinal innovations in response to perceived changes in the security environment from Operations Desert Storm to Iraqi Freedom. Furthermore, it examines the evolution of USAF technological and doctrinal developments, and whether these innovations caused unforeseen effects. This period of history illuminates the reciprocal relationship between innovation and change. If this paper is able to provide even some small insight for future USAF leaders on the Air Force's ability to innovate effectively in response to change, the USAF will be better prepared to face the challenges of the future and the inevitable 'next war.'

The Problem: War is Complex

Three central elements have characterized the nature of war since the beginning of time: violence, self-preservation, and uncertainty. Following Clausewitz's trinity of violence, logic, and chance, this paper suggests that the element of logic in war is about self-preservation. These three elements have a direct impact on the doctrinal and technological innovations of the USAF from its earliest ideas to the present. The three elements will play a central role in the analysis and explanation of USAF innovation in this paper. It is, therefore, necessary further to define each element and how it influences USAF innovation within the context of the complex undertaking that is war.

War's very nature is violence, the killing of people and the destruction of things in the pursuit of some interest. All forms of war use some sort of violence to coerce an adversary to one's will. Clausewitz referred to war's essence as the clash of interests that ends in bloodshed—a duel or struggle between two or more belligerents in which each contender tries to destroy the other through force.¹ The essence of war has remained unchanged since its earliest historical accounts. Thucydides' description of the Peloponnesian War between the ancient Greek city-states of Athens and Sparta exemplifies the violent nature of war as far back as 400 B.C. The concept of states going to war and using violence to pursue some interest remains relevant today. While violence remains a reality of war, Americans' decreased acceptance of risk, in the form of casualties and collateral damage—especially in conflicts not perceived to support an actual vital interest—present modern challenges requiring innovation.

There are several reasons for the evolution of U.S. societal and political casualty aversion. Edward Luttwak's theory of the "demographic base of modern, postindustrial societies" explains that, because death is currently more often the result of old age, instead of disease or war, early traumatic death has become a much rarer occurrence.² The medical profession back then was not close to what it is today, so it was normal for families before World War II to have six or more children knowing that infant and disease mortalities were very likely. Therefore, losing a family member did not hold the

¹ Carl Von Clausewitz, Michael Howard, and Peter Paret, *On War* (Princeton, NJ: Princeton University Press, 1976), 149.

² Edward Luttwak, *Strategy: The Logic of War and Peace*. (Cambridge, MA: Belknap Press of Harvard University Press, 1987), 71.

same weight as it would for families in the U.S. today, which have two children or less on average.³ This theory helps explain why U.S. citizens protested and refused to accept even a relatively small, compared to WWII, number of casualties in the Vietnam, Somalia, and Iraq conflicts. Casualties in these conflicts struck much closer to home, and triggered political change and pressure as a result. This societal evolution is important because, as the postindustrial society becomes more sensitive to death, tolerance for casualties in war decreases, which increases the need to innovate to avoid casualties.

War is not only about killing or violence, but also involves actions to ensure self-preservation. Clausewitz and Mao Zedong acknowledge that war is about killing, but also about protecting one's own forces.⁴ Commanders cannot expect to defeat an enemy's force if they cannot protect their own. Warfare, therefore, rewards those who find innovative ways to maximize violence against the enemy, while ensuring survival of their own forces. Self-preservation or survival remains a key motivator for innovation in war. From the knife to the machine gun, people have pursued innovations to gain an advantage in maximizing violence against the enemy while minimizing casualties for their own forces. These innovations do not happen in a vacuum, but are the product of what Clausewitz referred to as the logic of war in his "trinity" of violence, logic, and chance. Logic presupposes that war is subordinate to a higher purpose, an instrument of policy.⁵ It is from this element of war that the initial ideas of airpower developed.

The early theories of airpower developed on the progressive ideas that the innovation of powered flight would make war more efficient, decisive, and humane, as opposed to the horrors that defined trench warfare in the World War I (WWI).⁶ The advent of airpower transformed the way civilian and military leaders viewed time and space. They believed the air weapon would drastically reduce the time to force either victory or defeat because of its ability to cause massive destruction on the enemy while minimizing the need for the ground-force engagement that defined WWI.

³ Luttwak, *The Logic of War and Peace*, 71.

⁴ Clausewitz, *On War*, 98., Zedong Mao, *Selected Works of Mao Tse-tung* (Pei-Ching: Foreign Languages Press, 1978), 231-2.

⁵ Clausewitz, *On War*, 89.

⁶ See Mark Clodfelter, *Beneficial Bombing* (Lincoln: University of Nebraska Press, 2010).

Two of the more famous early airpower theorists, Billy Mitchell and Giulio Douhet, believed that the advent of airpower would make war more efficient by achieving *victory* in war faster. Airpower could manipulate time and space by neutralizing the enemy's ability to resist through attacks on their 'vital centers' at a lower casualty rate, therefore being more efficient and decisive than the slow mobilization of land or sea forces.⁷ Furthermore, the air weapon would not only shorten the war, but also be more humane by making war either too costly or achieving the result with such a quickness and surgical precision that countless lives on both the friendly and enemy side would be spared.⁸ Airpower's ability to destroy enemy vital centers without resorting to the trench warfare of WWI represented a key innovation. These theories suggest that early ideas about airpower directly related to the drive for self-preservation. Self-preservation and economy of force serves as the "logic" of air warfare. The idea that airpower can lead to victory at a lower cost, especially in casualties, has always been a motivator for both doctrinal and technological innovation in the USAF.

The final element in the nature of war is what Clausewitz says makes even the easiest tasks seem difficult.⁹ Clausewitz is referring to friction, but friction is only one part of the uncertainty that surrounds warfare. War is a complex undertaking defined by elements of chance, friction, and probability. It is a riddle that many warfare theorists and practitioners have tried to solve. The problem with trying to solve war's uncertain nature is that its character is always changing. There is no simple answer that can explain the best approach for the various characteristics war can take on, because the contextual elements surrounding each conflict are unique. For example, both Sun Tzu and Clausewitz wrote about war as a product of their times. During Tzu's time, armies were smaller and made up of mercenaries and a few conscripts. Clausewitz, however, was dealing with conscripts and large volunteer armies. Each wrote from the perspective of the weapons, technologies, and overall context that surrounded warfare in his time, and because changes in contextual factors affect the character of war, uncertainty always surrounds it.

⁷ Edward Kaplan, *To Kill Nations: American Strategy in the Air-Atomic Age and the Rise of Mutually Assured Destruction* (Ithaca: Cornell University, 2015), 10.

⁸ Kaplan, *To Kill Nations*, 11.

⁹ Clausewitz, *On War*, 119.

War is also political and, therefore, a human endeavor. Clausewitz said, “war should never be thought of as something autonomous, but always as an instrument of policy.”¹⁰ Politics dictated the U.S. gradualist intervention in the Vietnam War. Specifically, the fear of enticing China and/or the Soviet Union into a larger war was a key factor in U.S. decision-making in the Vietnam conflict. However, the enemy always has a say in war. The North Vietnamese did not cooperate with the U.S. strategy, and failed to provide a conventional target set throughout most of the war. This resulted in dysfunction and ultimately in defeat, as the U.S. failed to put together an effective strategy before public support for the war waned. The ever-changing political environment and unpredictability of other people only add to the uncertainty of war.

The current rapid pace of change enhances the problem of uncertainty due to its effect on the character of war. The industrial revolution increased the pace of change by starting an evolution of technologies that influenced the means and ways of warfare. The airplane, nuclear weapons, stealth, space assets, cyber, and other technological advances have influenced fighting and have contributed to the complexity of predicting the character of the next war. These advances have created conflicts that range from non-kinetic cyber-attacks to conventional warfare. Furthermore, predicting the actions and decisions of others is not an easy undertaking. What one person may think is a rational decision may seem unreasonable to others.¹¹ It is for these reasons and others that the character of war can change quickly. Technological advances coupled with the fact that war is a human endeavor full of chance and imperfect knowledge make war a complex, adaptive undertaking.¹² Therefore, the Air Force’s ability to adapt and innovate to overcome the challenges of the complexities of war is a vital, hard task today, and will be in the future to ensure the capability for engaging adversaries across the full spectrum of conflict.

The nature of war has remained relatively unchanged, and its core elements play an important role in the development of USAF doctrine and technological innovation. The evolution of humankind’s relationship with violence, self-preservation, and the

¹⁰ Clausewitz, *On War*, 88.

¹¹ Graham Allison and Philip Zelikow, *Essence of a Decision: Explaining the Cuban Missile Crisis* (New York: Longman, 1999), 20.

¹² Clausewitz, *On War*, 85-6.

managing of uncertainty represent a common thread in the following chapters. During this period, USAF technological and doctrinal innovation progresses through growing societal, political, and military pressures to avoid casualties. As this paper will show, USAF innovation exists not only as the product of these pressures, but also as a prod, as the relationship of change and innovation in the security environment is cyclical and interactive. New capabilities engender both political opportunity and social pressure.

Theories on Military Innovation

Three of the more popular theorists who have attempted to explain how innovation happens in the military are Barry Posen, Stephen Rosen, and Owen Cote. In *The Sources of Military Doctrine*, Posen proposes that innovation happens when there are changes in the strategic environment caused by competition of nations or in the balance of power. Perceived imbalance motivates politicians to intervene in military affairs using a ‘maverick’ inside the organization to institute radical change.¹³ In *Winning the Next War*, Rosen takes a different approach and suggests innovation happens from inside the military organization itself, rather than from external influence. This process happens through intraservice competition among subgroups that fight over how to redefine victory in response to changes in the security environment.¹⁴ Finally, in his dissertation, “The Politics of Innovative Military Doctrine,” Cote explains military innovation as the product of interservice rivalry or conflict. Interservice competition over funding provides the incentive for radical, innovative military doctrine.¹⁵ The common thread among these theories is competition, whether in the form of the balance of power between in nations, intraservice, or interservice. Any of these forms of competition can lead to military innovation.

Posen, Rosen, and Cote’s theories also imply the important role of preservation in military innovation. For Posen, it is the form of preservation of power. As politicians sense change in the security environment, they lean on the military to innovate or adapt to

¹³ Barry Posen, *The Sources of Military Doctrine: France, Britain, and Germany Between The World Wars* (Ithaca: Cornell University Press, 1984), 233.

¹⁴ Stephen Peter Rosen, *Winning The Next War: Innovation and The Modern Military* (Ithaca: Cornell University Press, 1991), 20.

¹⁵ Owen R. Cote, "The Politics of Innovative Military Doctrine: The U.S. Navy and Fleet Ballistic Missiles." PhD diss., 1996, 337-8.

these changes. Change happens quickly and usually occurs during a time of crisis because failure to innovate can lead to loss of international power and prestige. To explain this idea he addresses the French military's failure to recognize change in strategic environment from the firepower/trench warfare that defined WWI to the mobility warfare of WWII.¹⁶ Rosen's theory implies that change is hard and happens at a slow, generational pace, because it requires an "ideological struggle" between the old guard and reformers. Therefore, it takes time to grow or promote leaders in the military who can let go of the ways of the past and implement the new way of war. Preservation takes form for Rosen through the intraservice struggle between the old and new visions of victory.¹⁷ Cote's argument revolves around the preservation of a service's "core doctrine." When another service pursues a capability that may threaten an operational niche of one service, the threatened service will innovate in order to preserve the control over its core doctrine.¹⁸ The three theories together provide an excellent way to think about military innovation, and provided direction for this author's research. However, two have better explanatory power for USAF innovation during this period.

This research paper utilizes the ideas of Cote and Rosen by suggesting that competition and preservation are the sources of the USAF's innovation. These two theories provide the framework of analysis for this research. Discounting Posen's ideas on innovation, these two theories help to address innovation during times of peace and conflict motivated by competition and preservation. The difference in the form of competition described here is the product of both organizational self-preservation, and risk mitigation.

As described above in the theories of the early airpower advocates, the USAF has continually sought to make war more humane by minimizing the number of casualties, shortening war, and reducing costs and uncertainty. This idea remains relevant as a key driver of innovation in the USAF today as it was at its inception. Furthermore, organizational preservation has continually been a theme throughout the history of the

¹⁶ Posen, *Sources of Military Doctrine*,

¹⁷ Rosen, *Winning The Next War*, 20.

¹⁸ Cote, *Innovative Military Doctrine*, 350.

USAF. The focus of this paper is on the end of the Vietnam conflict to Operation Iraqi Freedom, and limits its scope strictly to airpower innovations of the USAF.

This paper will show that innovation in the USAF is the result of casualty aversion—combatant and non-combatant—that stems from failures and unacceptable levels of casualties in Vietnam. The failures of Vietnam stimulated societal, political, and military pressures for innovation in technology, training, and doctrine. Specifically, the U.S. “never again” mentality that derived from the Vietnam War experience started the USAF on a path of innovation that emphasized the survival of friendly forces and limiting collateral damage in order to avoid casualties on both sides of war.

Developments in major operations, from Desert Storm through Operation Iraqi Freedom, demonstrate how USAF doctrinal innovations both shaped and were shaped by changes in the security environment. At a macro level, these operations show the evolution of the USAF from a culture of overwhelming nuclear force to one of precision due to external and internal pressures. A micro-level view reveals that two of the major developments in airpower’s evolution were the steady transition from mass to precision and the increased distance between the Airman and the threat of death. These two developments started from the failures of Vietnam, and were emphasized after the success of Desert Storm. This success has given senior USAF leaders, politicians, and the U.S. civilian population the perception of airpower as a low-cost option, in terms of money and casualties, in fighting wars and resolving conflicts around the globe. However, as this paper will show, these innovations are not only the product of change, but can also be the cause of it.

Methodology

Three critical inflection points have shaped the direction of innovation in the USAF covered by this thesis; the Vietnam War, the end of the Cold War, and the 9/11 terrorists attacks. The high number of civilian and military casualties in Vietnam motivated the USAF to innovate to overcome organizational, doctrinal, and technological shortcomings. The end of the Cold War era brought about a change in the application of airpower from a nuclear mindset to one of precision. The change was brought about in part by the strategic environmental change from bi-polar—U.S. and the Soviet Union—to uni-polar (U.S. only). Furthermore, the terrorist attacks on September 11, 2001 ushered

in a new era of conflict with non-state Islamic extremism, bringing about a unique set of military challenges. These events heavily influenced the evolution of technological and doctrinal innovations of the USAF. This paper will focus on the innovations that occurred in the major operations from Desert Storm—the start of the Post-Cold War era—through Iraqi Freedom—the longest post 9/11 operation—to demonstrate the technological and doctrinal evolutions of the USAF that were shaped in part by these events.

Beginning with the aftermath of the Vietnam War and its impact on airpower's innovation in the Cold War, we move to an examination of Desert Storm. The impact of the defeat in Vietnam produced some of the most significant changes ever in the U.S. military. As innovations in USAF doctrine and technology occurred, Strategic Air Command's influence as the dominant organization in the USAF waned. Casualty aversion, coupled with the policy of 'flexible response,' began the gradual shift from strategic mass operations that had defined the USAF since its inception, to one focused more on tactical events. The shift to a more conventionally focused doctrine and technology during this timeframe paid huge dividends in Desert Storm. Chapter 1 shows how Desert Storm, a product of the lessons of Vietnam, began the steady evolution of the USAF from mass to precision, and mitigating risk to Airmen. It also highlights how a near bloodless war demonstrated the potential of airpower to reduce casualties and collateral damage, thus decreasing Western tolerance for casualties in war. The decreased tolerance for casualties and risk mitigation experienced in Desert Storm guided the decision to use airpower as the primary military instrument in follow-on conflicts.

Chapter 2 covers Operation Deliberate Force and Allied Freedom and discusses the implications of change as noted in the previous chapter. The end of the Cold War brought about many changes, including the unleashing of dormant ethnic and religious tensions in the Balkans. These tensions eventually culminated in the military intervention of the United Nations and NATO. The air campaigns in the Balkans proved an integral part in the enemy's decision to give in to NATO's demands. The campaigns gave airpower advocates proof that airpower could alone win wars by providing a cheap and easy solution to political problems. These campaigns highlighted the steadily increasing usage and development of precision and standoff weapons. They also reveal

other trends that were not so positive, such as a growing differential between U.S. and allied capabilities, stronger political control at the lowest operational levels, and a growing rift between U.S. ground and air forces that became apparent in Operation Enduring Freedom.

The next chapter presents an analysis of the first operation of a new millennium in the wake of terrorist attacks on the U.S. homeland. The attacks of 9/11 brought about several changes that forced the USAF to innovate. Operation Enduring Freedom ushered in a new age of airpower. The lack of traditional strategic fixed targets and the emergence of smaller, mobile, irregular targets defined this era. In short, the operational level of war almost disappeared. During this period, two important trends continued to develop: there was an increase in use of precision munitions, leading to fewer enemy casualties, and a progression in standoff capability to protect friendly forces.

Finally, an examination of the first part of Operation Iraqi Freedom reveals the strengths and weaknesses of airpower in this new era. The start of Iraqi Freedom demonstrated USAF innovations from real-time intelligence to leadership strikes with pinpoint accuracy. The technological advantage that allowed a joint air-land campaign with minimal casualties enabled the coalition to dispose of the Iraqi military in a matter of weeks. However, coordination between land and air forces proved to be a challenge. Additionally, the change in the character of the war, from conventional to counterinsurgency continued to shape the doctrinal and technological innovations of the USAF.

The last chapter of provides a summary and future implications for USAF leaders to consider.

This paper hopes to generate insight that may be helpful for future strategists and airpower advocates in understanding some of the motives and effects of doctrinal and technological innovations. In addition, it highlights some of the second- and third-order effects of technological and doctrinal innovations. This work will hopefully contribute to the existing literature on military innovation and serve as a point of departure for the growth and development of future USAF leaders' understanding on the subject.

Chapter 1

Desert Storm: Airpower's Second Evolution

By God, we have kicked the Vietnam Syndrome once and for all!

*George H. W. Bush
41st President of the United States*

One, the equipment worked and was vindicated against its critics. Two, we know how to orchestrate its use in a way that makes the sum bigger than all its parts.

*Les Aspin
Secretary of Defense 1993-1994*

The outcome of the Vietnam War had a profound influence on the advancement and direction of USAF technology, training, and doctrine and ushered in some of the most significant institutional changes since WWII. Coming out of WWII and into Vietnam, Strategic Air Command (SAC) was the dominating organization behind all USAF decisions.¹ When confronted with the challenges of the Vietnam War, Air Force leaders attempted to apply strategies that had proven successful in the past, but these were poorly suited to Vietnam's pre-industrial environment. Instead of adapting to the new strategic realities, Air Force leaders attempted to fit pre-existing airpower employment ideas into the current strategic situation. The result was failure, as military planners were never fully able to come up with a long-term successful strategy before American support for the war waned. The operations in Vietnam proved the need for doctrinal change away from massive strategic bombing and toward more tactically focused, precision-oriented operations. The historical legacies of Vietnam, along with changes in the post-Vietnam security environment, transformed the Air Force organizationally, doctrinally, and technologically.

Vietnam changed the perception of rising military leaders, American society, and politicians. It played an important role in the transformation of the USAF over the next two decades. The defeat in Vietnam produced a group of "never again" officers and politicians who played instrumental roles in Desert Storm. This "never again" mentality,

¹ SAC received an average of 46 percent of the total defense budget from 1952-1960, almost ten times as much as the tactical air forces. See Marshal L. Michel, *The Eleven Days of Christmas: America's Last Vietnam Battle* (San Francisco, CA: Encounter Books, 2002), 3.

combined with the recognized failures in Vietnam, forced the USAF to acknowledge the need to innovate in order to provide a range of options to meet emerging conventional and irregular threats. Additionally, Vietnam highlighted American society's sensitivity to casualties, both combatant and non-combatant. As war casualties increased, public support for the war decreased (see figures 1 and 2). Casualty aversion was not the only reason for loss of domestic support, because the war was widely unpopular from the beginning. The draft, civil rights movement, and other domestic issues all contributed to the war's declining public support. However, an important correlation exists between the uptick in casualties and the decrease of public support. Finally, as politicians abandoned 'massive retaliation' in favor of a 'flexible response' policy, there was a political requirement for the military to function more like a scalpel than a broadsword.²

Domestic and international pressures also required the USAF to adjust its doctrines and technologies to be trained and prepared for more than just large-scale, nuclear war. The conflicts in Korea and Vietnam showed that the USAF pre-war doctrine and technologies could not meet the range of conflicts in a politically acceptable way. In other words, political pressure forced the USAF to develop doctrine and technologies to avoid massive destruction and killing while also becoming better suited for a range of conflicts. Thus, the social, political, and military trends influenced the USAF to avoid casualties, its own and the enemy's, after Vietnam. The impact of the failures of Vietnam spurred USAF innovations in doctrine, technology, and training that enabled success in Desert Storm and shaped future perceptions of airpower.

The Desert Storm campaign marked the beginning of the post-Cold War era, but also ushered in a new era for the Air Force as well. For the air campaign in particular, Desert Storm marked the transition of the USAF from a mostly nuclear, blunt-force instrument to one of great power through precision. Ideally, the enemy would be systematically defeated by focusing on and destroying centers of gravity with such precision as to minimize casualties among combatants and non-combatants. These developments set new standards and expectations for military leaders, politicians, and the

² Mark Mazzetti, *The Way of the Knife: The CIA, a Secret Army, and a War at the End of the Earth* (New York, NY: Penguin, 2014), 5. A similar analogy was used in Mazzetti's book, but in reference to the transition of using conventional military forces to Special Forces and UAVs to combat terrorism.

American society to win and achieve quick and decisive victories with minimal casualties. For the first time, airpower seemed capable of delivering what its early advocates had said it could accomplish...a quick, decisive, and more humane type of warfare. Desert Storm marked the end of the Cold War, shook the stigma of Vietnam, and began a new evolution for the USAF.

Desert Storm marked the beginning of the shift from mass to precision-oriented warfare, which enabled Airmen to engage the enemy from safer distances to enhance survivability. The unprecedented performance of the air forces in Desert Storm conditioned American military, political, and societal expectations and demands for subsequent wars. The precedent set by Desert Storm led to the development of doctrines and technologies that continued the evolution of precision, thus ensuring preservation of friendly forces while limiting enemy casualties. We begin with an examination of the impact of Vietnam and the Cold War on USAF innovations leading up to the Desert Storm. An account of the 40-day air campaign in Iraq will demonstrate how innovations developed during the post-Vietnam era led to the decisive success of the air campaign. The chapter will conclude with a short summary of Desert Storm's impact on the evolution of airpower.

Vietnam: The wrong war at the wrong time with the wrong strategy

The air war in North Vietnam was one of the most costly the United States ever waged. The eight million tons of bombs dropped on Vietnam overshadowed the tonnage dropped on Germany and Japan during WWII. Yet, the North Vietnamese were able to fight through the bombing while imposing the loss of 3,322 US aircraft with 3,265 fatalities, despite having an inferior air force.³ The legacy of the air war in Vietnam shaped the forces that fought in the first Gulf War. The experience in Vietnam provided the catalyst for the technological, training, and doctrinal changes in the USAF that led to the success in Desert Storm. The Vietnam War was arguably one of the biggest failures in American military history. For the USAF, Vietnam highlighted the need for a change in doctrine. The doctrine with which the USAF entered Vietnam did not match the character of the war. One USAF historian went so far as to say, "When considered from

³ Chris Hodson, *Vietnam Air Losses United States Air Force, Navy and Marine Corps fixed-wing aircraft losses in Southeast Asia 1961-1973*, (Hinckley, England: Midland, 2001) 268.

the standpoint of air power theory and doctrine, the U.S. efforts in Indochina between 1965 and 1971 must be adjudged a failure verging on a fiasco.”⁴ The problem with USAF doctrine going into Vietnam was the Cold War and “the primary and only mission being the nuclear one.”⁵ The Eisenhower administration’s ‘massive retaliation’ policy, which assumed any global conflict would be nuclear, heavily influenced the direction of the USAF doctrine and technologies.⁶ SAC’s dominant position in the USAF at the time firmly established its doctrine and technology for nuclear war. Even though the Kennedy administration later instituted a policy of flexible response, “the Air Force continued to maintain that strategic nuclear forces provided the best instrument to prevent all wars at all levels. While conceding the need for some forces to be ready to fight limited and conventional wars, it remained wedded to the primacy of the nuclear arsenal as a deterrent to all kinds of war.”⁷ Fortunately, war is the true test of military doctrine and technology, and Vietnam exposed the inflexibility of the USAF’s nuclear-focused doctrine and technology.

The Vietnam War provided the test bed for the latest technologies of the USAF and the Soviets (via the North Vietnamese Air Force as proxies). In the larger context of the Cold War, the air war in the North had a significant impact on the U.S.-Soviet power struggle, and the development of U.S. doctrines and technologies that were pivotal in the air campaign’s success in Desert Storm.⁸ The air war in North Vietnam involved the latest fighters—F-4s and MiG-21s—and enabled the USSR to test its integrated air-missile-defense system against U.S. aircraft.¹⁰ The pitting of advanced technology against each other was important to the larger strategic context of the Cold War, because any indication that either the U.S. or Soviets had the ability to defeat the other’s latest

⁴ David MacIsaac, “The evolution of Air Power since 1945: The American Experience,” in Air Vice Marshal R.A. Mason, RAF, ed., *War in the Third Dimension: Essays in Contemporary Air Power* (London, Brassey, 1986), 19.

⁵ General T.R. Milton, USAF (Ret.) “USAF and the Vietnam Experience,” *Air Force Magazine*, June 1975, 109.

⁶ Campbell Craig, *Destroying the Village: Eisenhower and Thermonuclear War*, (New York: Columbia University Press, 1998) 52.

⁷ John Schlight, *The War in South Vietnam: The Years of the Offensive 1965-1968* (Washington, D.C.: Office of Air Force History, U.S. Air Force, 1988), 309.

⁸ Marshall L. Michel III, *Clashes: Air Combat over North Vietnam 1965-1972* (Annapolis, MD: Naval Institute Press, 2007), 1.

⁹ Michel, *Clashes*, 1.

¹⁰ Michel, *Clashes*, 2.

airpower innovations would have serious implications if the Cold War suddenly turned hot.¹¹ While neither country proved to have a serious advantage over the other, the air war in North Vietnam highlighted several deficiencies that required changes in technology and training.

Failures in the air campaign in North Vietnam brought to attention some of the shortcomings that led the USAF to a “regenerative process” of innovation for future conflicts.¹² Two major shortcomings of the air war for the USAF were training and equipment. Overall, the air-to-air performance of the USAF proved lacking due in large part to the wrong type of training. The focus of the USAF had been on nuclear missions, at the expense of more tactical operations.

The pilots were well trained, but for the wrong type of mission.¹³ This training shortfall led to lower kill ratios in the USAF (2:1) than the Navy (6:1) for Linebacker I and II flying the same aircraft, because the Navy had created a training program—Top Gun—that better prepared its pilots for conflict against MiGs.¹⁴ U.S. aircrews listed the accurate identification of enemy aircraft, weapons, and man-machine interface as deficiencies needing to be addressed in the post-Vietnam era.¹⁵ The ability to find, fix, and target enemy aircraft was severely degraded due to a lack of a true “look down” capability, especially when MiGs flew low to the ground (a tactic the North Vietnamese frequently used to their advantage). The missiles were unreliable. They regularly malfunctioned, and were designed for a non-maneuvering target such as the Soviet TU-95 Bear strategic bomber.¹⁶ Finally, the configuration of the cockpit in the F-4 did not allow pilots to change weapon switches without taking their eyes off maneuvering MiGs, which could mean the difference between life and death in a dogfight. The result of the training and equipment issues led to many failures and, ultimately, casualties.

¹¹ Michel, *Clashes*, 2.

¹² Max Boot, *War Made New: Technology, Warfare, and the Course of History, 1500 to Today*, (New York: Gotham Books, 2006) 322.

¹³ According to a USAF Red Baron Study more than 50 percent of fighter pilots had more than 2,000 hours of flying time. See U.S. Air Force, *Air War—Vietnam*, (Indianapolis; New York: Bobbs-Merrill, 1978), 22.

¹⁴ Cited in Michel, *Clashes*, see Project Red Baron III, USAF Fighter Weapons Center, vol. I, part I, Appendix A: *Air-to-Air Losses in Southeast Asia*, A-2-3.

¹⁵ Michel, *Clashes*, 285.

¹⁶ Michel, *Clashes*, 151, 157.

The bombing campaign in North Vietnam was less about technological issues and more about the misapplication of means to the strategic context of the war. Air Force leaders failed to heed Clausewitz's dictum that understanding the kind of war one is in is key to its success.¹⁷ Thus, air planners failed to embrace the irregular character of the Vietnam War and attempted to make the war fit the weapons and doctrine at hand. The perceived successes of the strategic bombing campaign toward the end of WWII created a seductive paradigm.

This strategic paradigm started with the early airpower theorists and continued to develop after WWII due to the combination "of Air Corps Tactical School training, World War II experience, and post war planning. Air commanders believed that by attacking an enemy's economic vital centers they could destroy its war-making capability, which would....produce the loss of social cohesion and will to fight."¹⁸ USAF leaders believed a third-world country like Vietnam should succumb to the same strategic forces used to defeat superior German and Japanese forces in WWII. Air planners failed to consider that third-world countries do not have the same type of centralized metropolitan infrastructures necessary for the successful execution of this doctrine. Interestingly, even in the face of failure, the bombing doctrine remained unchanged because Air Force leaders blamed political constraints, not doctrine, for the failure.¹⁹ Not until the post-Vietnam era did planners refine doctrine to reflect a more flexible concept for the employment of airpower.

The air campaign in North Vietnam was a defining moment for the USAF. The conflict revealed the problem of having an overwhelmingly nuclear-focused doctrine, technology, and training. This resulted in an incredibly low air-to-air kill ratio (2.4:1) compared to the previous conflict in Korea (4.7:1 in 1950-52 and 13.9:1 in 1952-1953).²⁰ Furthermore, as the number of casualties in Vietnam rose and peaked out in 1968, U.S.

¹⁷ Carl Von Clausewitz, Michael Howard, and Peter Paret, *On War* (Princeton, NJ: Princeton University Press, 1976), 88-89.

¹⁸ Mark Clodfelter, *The Limits of Air Power: The American Bombing of North Vietnam*, (Lincoln, NE: University of Nebraska Press, 2006), 206.

¹⁹ Clodfelter, *Limits of Airpower*, 207.

²⁰ Benjamin S. Lambeth, *The Transformation of American Airpower*, (Ithaca, NY: Cornell University Press, 2000), 45.

public support for the war began to decline below 50 percent (see figures 1 and 2).²¹ In addition to the increased numbers of casualties, extensive media coverage of the ground war brought images of American and Vietnamese casualties into the home of every American with a television. The increased number of casualties and the intimacy of the war in American homes via media coverage led to one of the largest, if not the largest, anti-war movements in U.S. history. The declining U.S. public support pressured American politicians to withdraw all U.S. forces and end the Vietnam War. The Vietnam experience left a lasting impression on American civilians, politicians, and military leaders, creating the “never again” generation. This generation shaped the evolution of the USAF during the years leading up to Desert Storm.

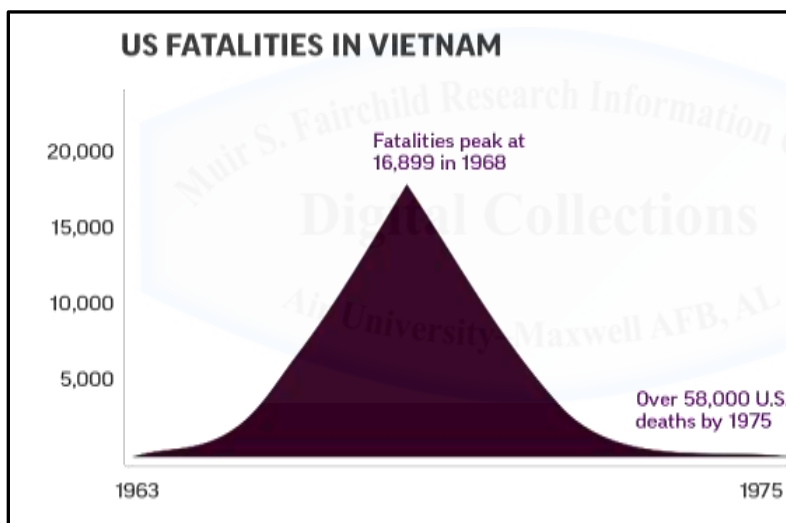


Figure 1. U.S. Fatalities in Vietnam War

Source: Associated Press retrieved on 18 February 2017 from <https://www.ap.org/explore/vietnam-the-real-war/>

²¹ There were 58,220 total U.S. military casualties for the Vietnam War. 2,586 of the casualties were from the USAF, while 39,963 were from the Army. This total was higher than anticipated against an enemy that was perceived as numerically and technologically inferior. See U.S. National Archives, *Statistical information about casualties of the Vietnam War*. Retrieved on February 17, 2017 from <https://www.archives.gov/research/military/vietnam-war/casualty-statistics.html#page-header>

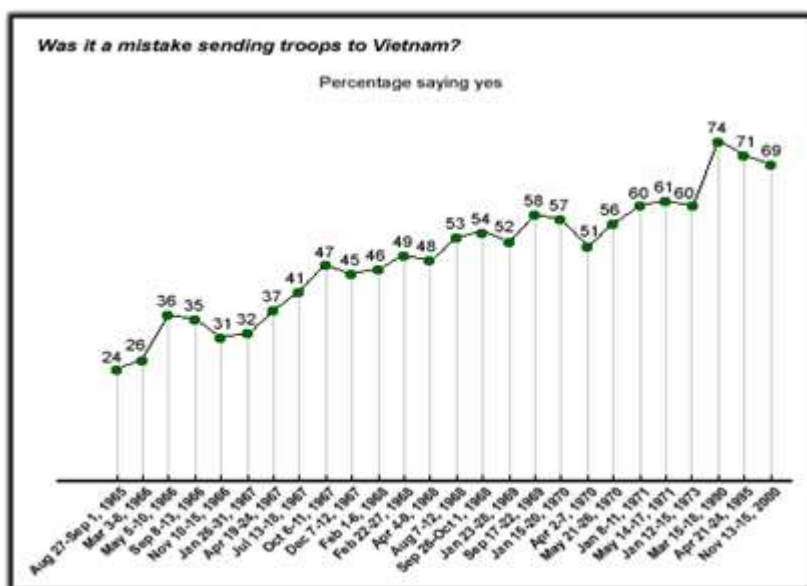


Figure 2. U.S. Support for Vietnam War

Source: Joseph Carroll, “The Iraq-Vietnam Comparison,” *Gallup Poll* (June 15, 2004) <http://www.gallup.com/poll/11998/iraqvietnam-comparison.aspx>. As U.S. fatalities in Vietnam peaked in 1968, majority support for the war began to decline.

The Post-Vietnam Era: The Evolution in Technology, Training, and Doctrine

The painful experiences of Vietnam, along with developments in the international security environment, provided the motivation and direction for technological and doctrinal innovation that ensured the airpower victory in Desert Storm. During the Vietnam War, the Soviet Union carried out a large-scale expansion of its own nuclear and conventional forces. In some areas, it actually reached parity with the U.S. nuclear forces that had previously held an advantage.²² Furthermore, Soviet influence began to expand and had major security implications, especially in the third world. This new development provided the “United States and its NATO allies....[a] preview of what an all-out showdown with the newly expanded Soviet conventional force posture might entail” in the 1973 Yom Kippur War.²³

The results of the Arab-Israeli wars revealed a much-improved Soviet integrated air defense system (IADS) technology that could severely degrade any offensive air

²² ICBMs and submarine launched ballistic missiles, see Lambeth, *Transformation*, 54.

²³ Lambeth, *Transformation*, 55.

operations. However, the conflict also provided the blueprint for how to defeat an enemy when largely outnumbered. Eroding American technological advantage, along an increasing Soviet conventional numerical edge, presented the U.S. with its biggest strategic problem coming out of Vietnam.

The U.S. initiated the development of superior technology as a force multiplier to diminish the Soviet advantage. This idea, commonly referred to as an “offset strategy,” required developing innovative technologies to counter an adversary’s numerical superiority. The offset strategy was not a new concept. An earlier offset was the atomic bomb. At the start of the Cold War in the 1950s, the Soviet land forces held an overwhelming numerical advantage over the U.S. Instead of trying to match the Soviets symmetrically, U.S. security policy relied on nuclear weapons to provide an asymmetrical “offset.” The threat of Soviet nuclear parity and their overwhelming numerical advantage in conventional forces drove the demand for the modernization of the USAF conventional inventory, and led to the development of several new technologies that would help ensure the survival of friendly forces.

The failures in Vietnam and the looming Soviet threat led to the development of the fourth-generation fighter with capabilities far beyond any of the existing fighter aircraft.²⁴ The evolution to fourth-generation aircraft produced many innovative features such as track-while-scan radars, better acceleration and vertical performance, and improved maneuverability for close combat.²⁵ The performance characteristics of the new aircraft (F-15/16) were far superior to anything the USAF had in Vietnam. In fact, the new aircraft overcame the man-machine interface issues of the F-4 with the development of a heads up display (or HUD) and the configuration of hands on throttle and stick. Additionally, new precision air-to-ground weapons were developed such as the GBU-15 2,000-lb bomb, the AGM-130 (offering increased standoff ranges), and the AGM-88 high-speed anti-radiation missiles (HARM) for attacking IADS.²⁶ Combined

²⁴ The first generation of jet fighters was exemplified by the U.S. F-86 Sabre and Mig-15. The second generation was led by the U.S. F-100 Super Sabre and Soviet MiG-19. The third generation was characterized by the U.S. F-4 Phantom II, the Soviet MiG-21, and the French Mirage IIIC. The fourth generation, which equips most modern air forces today, is represented by the F-14/15/16/18 class of fighters and the Russian MiG-29 and Su-27. The U.S. Air Force’s stealthy F-22 and F-35 are the fifth generation of fighters. See Lambeth, *Transformation*, 72.

²⁵ Lambeth, *Transformation*, 72.

²⁶ Lambeth, *Transformation*, 77.

with the development of a night and under-the-weather pod, the new fourth-generation aircraft provided the capability to target deep within enemy territory with a higher level of precision and from safer distances. This evolution of technologies overcame issues recognized in the Vietnam War, while at the same time increasing the chances of survivability.

Other technological developments that evolved from the Vietnam experience and the Soviet threat involved greater investments in air-to-air munitions, electronic warfare, and advanced strategic aircraft. Upgrades to the AIM-7 (F variant) and AIM-9 (L variant) provided the new capability of firing at an adversary from any aspect, whereas during Vietnam aircraft had to maneuver to a firing position directly behind enemy aircraft in order to be effective. Improvements to radar-warning receivers allowed aircraft to detect hostile radar systems and provide bearing and range of enemy aircraft. Furthermore, the production of the E-3 Airborne Warning and Control System (AWACS) solved the problem of detecting, identifying, and tracking enemy aircraft at longer ranges, while the EC-130H Compass Call was built to jam enemy ground control, denying them the ability to detect and relay allied aircraft location.

Even though these technologies represented a dramatic shift from the nuclear-strategic focus of the past, the biggest achievement of this period was the advancement of strategic bomber aircraft. The development of a supersonic bomber (B-1B) and stealth aircraft (B-2 and F-117) put the USAF well ahead of any other nation's airpower capability. The stealth capability put the USAF so far ahead of any air force that three decades later no other country had produced an operational stealth aircraft.²⁷ The conjunction of these technological innovations increased the USAFs ability to get a kill in the air or on the ground at greater distances, while maximizing survivability.

Even though technological improvements were vast during this period, they represent only one of many USAF innovations. As an official TAC journal noted "we [Tactical Air Command] may have concentrated too extensively on improving the machine and have not spent enough effort on the man who must fly it or on the training

²⁷ There are other countries that are in the process of developing stealth aircraft, but no other country has developed their own operational stealth aircraft as of 2017. However, other countries have purchased a variant of the F-35 Joint Strike Fighter from the United States.

which he must have to make that machine an exploitable advantage.”²⁸ The experience of Vietnam with the growing Soviet threat in Europe spurred the requirement for a highly capable air force. If the lessons of Vietnam suggested anything, it was the value of aircrew training. The disparity between the USAF and Navy in kill ratio alone, based on the impact of Topgun, showed that a pilot’s proficiency was just as important as the aircraft he was flying.²⁹ A post-war study titled Project Red Baron II supported this idea, noting that the 89 percent of the fighter pilots interviewed believed that current air-to-air training was inadequate.³⁰ The lessons of Vietnam led to the development of training programs that increased the combat potential of the USAF and facilitated success in the Desert Storm air campaign.

The Vietnam experience led to the development of several training programs. One of the first programs established dissimilar air combat training (DACT), where different (or dissimilar) types of aircraft emulated enemy tactics. In the pursuit of better training, the USAF stood up aggressor squadrons, whose sole purpose was to be experts at flying Soviet-style tactics in dissimilar aircraft to give USAF aircrews a realistic experience of what flying against enemy aircraft would be like. DACT soon expanded to the first large-force exercise called Red Flag. The intent of Red Flag was to provide air-to-air warlike experience in a peacetime, controlled environment at an operational-level scale. The theory evolved from evidence that showed when pilots made it through their first 10 missions, odds of survival increased substantially.³¹ The success and popularity of Red Flag soon produced several other training programs such as the air-to-ground centric Green Flag, live-missile exercises, and the integration of sister services and other countries. All of these training-program improvements were the product of the failures in Vietnam; and, after years of intensive application, firmly reestablished USAF as a force that was “second to none.”³²

As the USAF became better-equipped and well-trained, the next challenge lay in developing a doctrine to overcome the numerically superior Soviet forces. Doctrine is

²⁸ Quoted in Michel, *Clashes*, 289.

²⁹ Lambeth, *Transformation*, 59.

³⁰ Cited in Michel, *Clashes*, see Project Red Baron II: Air-to-Air Encounters in Southeast Asia, Vol. I. Executive Summary, Cameron Station, Va., Defense Documentation Center, June 1974.

³¹ Lambeth, *Transformation*, 62.

³² Quoted in Lambeth, *Transformation*, 71.

the military's published way of doing things in response to the goals of a nation's grand strategy. For the U.S., the objective was to be able to defeat the growing Soviet armored and mechanized infantry force that by 1986 was ready to put forth between 90 and 120 divisions with 3,600 combat aircraft.³³ Additionally, by the mid-1980s, the Soviets had developed their own 4th-generation aircraft comparable to what the USAF had at that time, and were producing them at a rate three to four times that of the USAF. The challenge for the USAF, therefore, was figuring out how to maximize a better-trained and equipped force against a numerically (air and land) superior opponent. This initiated several iterations of Army/Air Force doctrines and theories on how to employ their forces most effectively against the Soviet threat.

What eventually evolved, on the surface, was a tactically oriented air focus that would act in conjunction with land forces in a blitzkrieg-style counter offensive on the front and rear echelons of the massive Soviet forces.³⁴ However, as the Army formulated what victory would look like in the AirLand Battle (ALB) doctrine, the USAF never fully bought into the concept, because the Army version of the Soviet threat was more land than air-centric. This meant that the USAF would be limited to a supporting role, instead of being able to pursue strategic targets as it had in the past. The authors of ALB overlooked the fact that the USAF, throughout its history, had fought to break away from the supporting function it maintained as a component of the Army until 1947. ALB reinvigorated one of the oldest doctrinal debates of the twentieth century: the "relationship between air and land power."³⁵ Two major airpower theorists of the time, however, developed ideas that focused on the air as the supported component.

John Boyd and John Warden profoundly influenced the USAF approach to airpower tactics, operations, strategy, and doctrine. These two USAF Colonels held so much influence over air operations over the last three decades that they are often mentioned together even though their theories differ in the level of their application. Boyd's theory is more psychological in nature, because it deals with getting inside the enemy's decision cycle. He breaks down the decision-making process into what he calls

³³ Lambeth, *Transformation*, 57.

³⁴ Keith Shimko, *The Iraq Wars and America's Military Revolution*, (New York, NY: Cambridge University Press, 2010), 46.

³⁵ Shimko, *Iraq Wars*, 47.

the “OODA loop,” which stands for observation, orientation, decision, and action. Boyd reflects a psychological approach “to get inside the mind and the decision cycle of the adversary.”³⁶ The objective is to be able to move through the decision cycle faster than your adversary so that the enemy is making decisions based on old information, leading to overall confusion and psychological paralysis. Warden’s theory, in contrast, focuses on the physical incapacitation of enemy forces by breaking the enemy down into a system of rings, or centers of gravity. The objective is to destroy the tangible assets of the enemy in order to eliminate his ability to think and communicate, thereby forcing capitulation.³⁷ Though both theories aimed to defeat the enemy, one focused on how to think and approach fighting the fog of war, while the other was Jominian in its prescriptive nature, focusing on direct attacks against specific target sets.³⁸ Warden’s theory eventually became the “philosophical and theoretical framework for conceptualizing, planning and executing” the Desert Storm air campaign.³⁹ The land-forces, however, would have a say, and the Desert Storm campaign eventually evolved to look more like the AirLand Battle concept than Warden’s vision of strategic paralysis.

Desert Storm: Airpower’s Transformation in Action

The years that followed Vietnam brought about many changes in the USAF, and the Desert Storm air campaign marked the culmination of airpower’s transformation from a blunt force instrument to one guided by precision. Operation Desert Storm began on January 17, 1991, and ended on February 28, 1991. Airpower played a vital role in the systematic defeat of Iraqi forces in Kuwait. However, the sweeping success of airpower in the Gulf War set a new level of expectation among the American military, society, and political leadership: win quickly (six weeks), decisively, and with few casualties (148 American combat casualties out of more than 500,000 military personnel deployed).⁴⁰ This section details the operational level of the air campaign in Desert Storm and the impact of the innovations leading up to the campaign.

³⁶ Robert Coram, *Boyd: The Fighter Pilot Who Changed the Art of War* (New York: Back Bay Books, 2002), 335.

³⁷ John Andreas Olsen, *Airpower Reborn: The Strategic Concepts of John Warden and John Boyd*, (Annapolis, Maryland: Naval Institute Press, 2015), 5.

³⁸ Antoine-Henri Jomini authored theories on war that were very prescriptive in nature. See Jomini, *The Art of War*.

³⁹ Shimko, *Iraq Wars*, 49.

⁴⁰ Lambeth, *Transformation*, 103.

The cause of the first Gulf War was an invasion of Iraq into Kuwait over an Iraqi economic-warfare dispute. Saddam Hussein accused Kuwait of conspiring with the U.S. to lower world oil prices and stealing from the Rumaila oil field. On 2-4 Aug 1990, Iraq invaded Kuwait by sending 120,000 troops, 850 tanks, special operations forces, and naval assets in a combined-arms assault in an attempt to annex the country. The result was international outrage that led to a coalition response with clearly defined objectives, and ushered in the dawn of a new era of airpower.

The Iraqi invasion of Kuwait presented the United States with the first situation since the Vietnam War where there was potential for a high number of casualties, and airpower was the logical choice for avoiding them. The Iraqi military was, at the time of the invasion, one of the largest forces in the world. Furthermore, U.S. senior leaders believed that by the time U.S. land forces could be in theater, the Iraqi army would be well-prepared and entrenched in order to erode the political will of the coalition by causing maximum casualties.⁴¹ The Iraqi invasion of Kuwait, therefore, presented military planners with the dilemma of trying to remove hundreds of thousands of Iraqi troops from Kuwait while avoiding a costly and bloody ground campaign. Airpower seemed the logical choice to set the conditions for a less-costly ground campaign.

The core of what eventually became the Desert Storm air campaign was a product of chance. General Norman Schwarzkopf was looking for alternatives to a costly ground campaign. He asked the Vice Chief of Staff of the Air Force (VCSAF) to put together an air option for the situation in Kuwait. The VCSAF would have normally tasked this to the Air Staff's chief for plans and operations. As luck would have it, that officer was on leave at the time, so the request eventually made its way to Warden, who was the deputy director of plans for warfighting concepts.⁴² The situation provided Warden an opportunity to show how the previous 15 years of innovation in doctrine, technology, and training made the potential of airpower greater than ever before. Warden and his staff proposed a plan that would attempt to win the war with airpower alone.

Warden produced what was to be the conceptual framework for the Desert Storm air campaign. He and his staff developed Instant Thunder, a six-day air campaign

⁴¹ Shimko, *Iraq Wars*, 56-7.

⁴² Lambeth, *Transformation*, 105.

designed to produce strategic paralysis through the destruction of 84 strategic Iraqi targets. The plan called for “about a thousand sorties...each day, bombing presidential palaces, telephone exchanges, government ministries, internal security organs such as secret police headquarters, and electrical power, oil refineries, bridges and railways.”⁴³ Warden briefed the plan to Schwarzkopf and General Colin Powell,—the Chairmen of the Joint Chiefs of Staff—both of whom approved of the plan, but also found that it lacked an emphasis on reducing the Iraqi ground forces.⁴⁴ Instead of heeding the two Army Generals’ advice, Warden briefed the plan to Lieutenant General Charles A. Horner,—the Joint Forces Air Component Commander—who also agreed with Schwarzkopf and Powell that it was lacking an emphasis on attrition of the ground forces. For this reason, plus some other personal reasons, Warden was sent back to Washington, while some of his staff was chosen to stay and lead the planning of the coalition air campaign. Then-Lieutenant Colonel David Deptula, who was integral in the developing of Instant Thunder with Warden, was one of those who stayed behind and became an important part of the planning team. In the end, Warden’s Instant Thunder became the core for the operational-level objectives of the Desert Storm air campaign.⁴⁵

The strategy of Desert Storm was to gain control of the air, utilize airpower to isolate and attrite the Iraqi ground forces, and then bring in ground forces to drive the Iraqi forces out of Kuwait.⁴⁶ The first challenge for the USAF was to gain air superiority against the Iraqi air force that was the sixth largest in the world, and had in its inventory many technologically advanced Soviet and French fighters.⁴⁷ The main threat to air superiority over Iraq was not its offensive capability, however, but its ground-based air defenses.

The U.S.-led coalition needed to suppress the Iraqi IADS to gain air superiority. The suppression plan revolved around knocking out the command-and-control (C2) system of the IADS with Tomahawk land-attack missiles (TLAMS) and precision-guided

⁴³ Stephen Budiansky, *Air Power: The Men, Machines, and Ideas That Revolutionized War, from Kitty Hawk to Iraq* (New York, NY: Penguin Books, 2005), 414–15.

⁴⁴ Tom Clancey and Chuck Horner. *Every Man a Tiger: The Gulf War Air Campaign*. (New York: Berkley, 2000), 259.

⁴⁵ Lambeth, *Transformation*, 106.

⁴⁶ Clancey. *Every Man 505*.

⁴⁷ The Iraqi Air Force had 35 MiG-29s and 65 Mirage F-1Es. See Shimko, *Iraq Wars*, 183.

bombs dropped from F-117 stealth aircraft; then, by using drones for surveillance and fighters equipped with HARMs, to destroy the radar-guided SAMs. This plan intended to suppress the Iraqi IADS without risking numerous casualties to friendly forces.⁴⁸ A 15,000-foot altitude floor was set to avoid friendly aircraft losses to radar-guided Iraqi surface-to-air missiles in response to the loss of two F-16s that were operating over Baghdad with a 10,000-foot altitude floor. The attacks, however, effectively eliminated the Iraqi IADS within the first eight hours of the war.⁴⁹ Furthermore, dominance over Iraqi fighters resulted from the integration of F-15Cs and airborne battle management information from the E-3 AWACS, which led to the downing of Iraqi fighters at such great ranges that they literally never knew what hit them. For example, of the 33 air-to-air kills recorded, over 40 percent were attributed to beyond-visual-range (BVR) missile shots.⁵⁰ The first phase of the air campaign shows how the evolution of technology and doctrine enabled the USAF to gain air superiority while minimizing the risk of casualties to friendly forces through stealth, precision, and BVR weapons. As a result, the coalition achieved air superiority in a matter of days, and the Iraqi air forces ceased being a factor after the first week.

The second phase of the air campaign featured innovations in strategic-attack doctrine and technologies influenced by political constraints that demanded the minimizing of casualties. The phases were accomplished simultaneously in order to keep the enemy off balance. As the coalition forces were establishing air superiority, they were looking to carry out the strategic paralysis embodied in Warden's doctrine by targeting Iraqi leadership, military capabilities, and neutralizing their capacity to fight.⁵¹ The idea was to strike leadership, communication nodes, infrastructure, and other weapon systems to produce so much friction that the Iraqi political and military leaders would be unable to coordinate effective military responses. Airpower in the leading role of the

⁴⁸ Shimko, *Iraq Wars*, 184.

⁴⁹ Comments in a draft by Lieutenant General Buster C. Glosson, USAF. Quoted in Lambeth, *Transformation*, 113.

⁵⁰ Lambeth, *Transformation*, 114.

⁵¹ Thomas Keaney and Eliot Cohen, *Gulf War Air Power Survey: Volume 2, Operations and Effects and Effectiveness, part 1*, Government Printing Office, 1993, 5.

campaign “represented a significant departure from the established military doctrine of the time.”⁵²

The doctrinal innovation was also a change from established WWII doctrine where physical destruction of industrial targets defined success. Strategic airpower in Desert Storm aimed to paralyze the Iraqi leadership, creating confusion and the inability to provide an effective military response. This was the start of effect-based operations (EBO). Deptula wrote about the difference between EBO and physical-destruction doctrines of the past when he stated that EBO was about “the use of force to control rather than destroy an opponent’s ability to act.”⁵³ The goal of EBO was to achieve certain effects rather than just physical destruction. EBO was the backbone of Warden’s theory. Breaking down the enemy into a system, and gaining control over certain aspects of the system the enemy relied on for power, such as leadership, population, industry, transportation, and military forces to achieve military and political objectives.⁵⁴

Additionally, the manner in which the USAF accomplished this was also a drastic change from the past. Instead of using the traditional heavy bombers in mass for this type of mission, the coalition used F-117s armed with precision munitions such as laser-guided bombs (LGB) developed late in the Vietnam War.⁵⁵ Even though LGBs accounted for only 9000 of the approximately 220,000 total bombs dropped in Desert Storm, their second- and third-order effects demonstrated the change from WWII. For example, there were some cases where one precision-munition carried by one aircraft could achieve the same effect “as a 1000-plane raid with over 9000 bombs in World War II—and without the associated collateral damage.”⁵⁶ The development of doctrinal change could also be due partly to the political constraints put on the strategic planners to minimize casualties.

Casualty avoidance was a major concern for the air campaign. Pilots operating in highly populated areas like Baghdad went out of their way to avoid collateral damage,

⁵² Shimko, *Iraq Wars*, 188.

⁵³ David A. Deptula, “Effects-Based Operations: Change in the Nature of Warfare,” *Aerospace Education Foundation*, 2001, 5.

⁵⁴ See John A. Warden III, “The Enemy as a System,” *Airpower Journal*, Spring 1995, 41-50.

⁵⁵ Richard G. Davis, *Decisive Force: Strategic Bombing and the Gulf War*, (Washington D.C., Air Force History and Museum Program, 1996) 4-5.

⁵⁶ Deptula, *Effects-Based*, 9.

because of the fear that negative media coverage would attract unfavorable publicity.⁵⁷ Even with the extreme measures to avoid collateral damage, an attack on a command-and-control bunker killed between 200-300 women and children who had taken shelter on the top floor. The negative press was so bad that it led General Schwarzkopf to make central Baghdad off limits for a period.⁵⁸ Moreover, in the early stages of the air campaign, General Horner, stated, “No enemy target is worth one of our aircraft. If you can’t hit it today, because of weather or enemy defenses, go somewhere else and we will come back tomorrow.”⁵⁹

The ability of airpower to take out the Iraqi IADS and air forces is one of the most praised parts of Desert Storm. Airpowers’ almost complete impunity in engaging with enemy land forces, however, enabled the success of the “100-hour war.” In the second month, airpower transitioned from IADS, infrastructure, leadership, and weapons-system targeting to “shaping the battlefield.” This phase of the operation focused on targeting the Iraqi frontline forces directly to attrite them by at least 50 percent. Ground commanders required the reduction in Iraqi forces in order to initiate the ground war. They believed that the reduction of the Iraqi ground forces by this factor would ensure that fewer coalition ground forces would be lost during the ground offensive.⁶⁰

When the ground war to liberate Kuwait started, airpower had effectively shaped the battlefield for the coalition ground forces due to the innovations of technologies such as the E-8 Joint Surveillance and Target Attack Radar System (JSTARS). The E-8 was able to detect ground movement of trucks, tanks, and masses of troops in all environments. This capability enabled air assets to redirect from one mission to the next with near real-time information on the enemy location through the battle management function of the JSTARS platform. The combined use of technical innovations such as the JSTARS, precision munitions, and fourth-generation aircraft essentially disarmed the Iraqi military due to the continual and nearly uncontested aerial barrage. It caused the Iraqi army to fear approaching any of their military vehicles, because airpower attacks

⁵⁷ Shimko, *Iraq Wars*, 190.

⁵⁸ Wayne W. Thompson, “Al Firdos: The Last Two Weeks of Strategic Bombing in DESERT STORM,” *Air Power History*, Summer 1996, 63.

⁵⁹ General Chuck Horner quoted in Clancey, *Every Man*, 489.

⁶⁰ Clancey, *Every Man*, 469.

had essentially made any suspected Iraqi military vehicle a deathtrap.⁶¹ As one aircrew stated after the war “if the armies dig in, they die. If they come out of their holes, they die sooner.”⁶² The ground offensive operation—Desert Sabre—was dubbed the “100-hour war” because the combination of coalition ground and air forces systematically destroyed Iraq’s army and liberated Kuwait in a matter of four days. The operation resulted in the surrender of nearly 80,000 of 200,000 Iraqis in the Kuwaiti theater of operations.⁶³ The U.S. succeeded in its objective to remove the Iraqi forces from Kuwait.

The Desert Storm war experience was a critical moment for the USAF. It validated 15 years of developing technology, training, and doctrine that transformed the USAF from a service focused on mass to one of precision. Technological developments such as stealth to overcome enemy IADS and drop munitions with near impunity reflected a drastic change from the large-scale B-52 bombing operations of Vietnam. The use of precision munitions offered a cost-effective option for airpower, in terms of fewer aircraft and munitions required for a target, but made up only nine percent of the total munitions expended.⁶⁴ Part of the reason for the small usage was the fact that two-thirds of the air-to-ground strikes in Desert Storm were directed at Iraqi ground forces in the open desert of Kuwait, where collateral damage was extremely low.⁶⁵ Therefore, unguided munitions were a cost-effective option for aerial-barrage missions against Iraq’s conventional land forces.

The Desert Storm air campaign highlights a turning point when Airmen began operating at greater distances while still engaging the enemy. The development of information weapons systems, such as the AWACS, JSTARS, and the Compass Call provided essential information to attack aircraft, increasing their situational awareness to and employ munitions at distances beyond visual range. Conversely, these information systems denied the enemy the ability to do the same, which increased the odds of survival of friendly forces and reduced some of the uncertainty in distinguishing between a friend or foe in an air engagement. Furthermore, Desert Storm was the first major operation in

⁶¹ Clancey, *Every Man*, 469.

⁶² Tony Capaccio, “Air Force Used Vintage Aardvarks to ‘Plink’ Tanks,” *Defense Week*, March 4, 1991, 1.

⁶³ Clancey, *Every Man*, 477.

⁶⁴ Tony Mason, “Operation Allied Force, 1991,” in John Andreas Olsen ed., *A History of Air Warfare*, (Washington, D.C.: Potomac Books, 2010), 250.

⁶⁵ John Andreas Olsen, *A History of Air Warfare*, (Washington, D.C.: Potomac Books, 2010), 193.

which space support played a key role. Space assets assisted in providing navigation, communications, terrain, and environmental information as well as attack warning and ISR. These technologies gave the USAF an unprecedented advantage by reducing the information uncertainty and overcoming other failures stemming from the Vietnam War. The *Gulf War Air Power Survey* suggests the overall impact of these technologies, when combined with the other training and doctrinal developments, not only hinted at airpower's evolution, but also a transformation of war: "In this war, air power crossed some operational thresholds that, if not as obvious as the initial use of a new weapon or operational concept, did suggest a transformation of war."⁶⁶

Conclusion

The Vietnam War constituted a major point of departure for the USAF. The failures in Vietnam highlighted the need for change. USAF leaders, inspired by the Vietnam experience as well as the strategic challenge of a massive Soviet land and air force, drove technological, training, and doctrinal innovation. These innovations started the USAF's evolution of doctrines and technologies aimed at decreasing the number of casualties and enhancing the chance of survival through the innovations that increased precision and distance. Desert Storm proved to be the ideal war for airpower to test all the developments from the post-Vietnam era.

Fifteen years of trying to overcome the failures of Vietnam while simultaneously trying to counter the Soviet threat put the USAF in a near perfect position to face Iraq in 1991. The Persian Gulf War provided the test of innovations developed in the wake of Vietnam against an opponent "that had been a constant friend and beneficiary of the Soviet style of command and tactical doctrine, and which was equipped overwhelmingly with the products of Soviet technology."⁶⁷ Furthermore, the Desert Storm experience was in a highly permissive desert environment against a smaller military force than the former Soviet Union. The Iraqi military had few places to hide in the flat and bare deserts of Kuwait and Iraq. In terms of meeting the military and political objectives, the mission was a success. It should be mentioned that it is unlikely that the USAF, armed

⁶⁶ Thomas Keany and Eliot Cohen, *Gulf War Air Power Survey Summary Report*, Government Printing Office, 1993, 242-243.

⁶⁷ Richard Hallion, *Storm Over Iraq: Air Power and the Gulf War*, (Washington D.C.: Smithsonian Institution Press, 1992), 81.

with the innovations used in Desert Storm, would have been successful in Vietnam. One major reason for this is that the Vietnamese lacked targets of real “strategic” value—lack of industry had dramatic effect on the North Vietnamese leadership’s decision calculus. However, the results of the Iraq War, against a technologically and numerically inferior opponent in an advantageous environment, had several implications for the future direction of American warfare.

The Desert Storm air campaign did more than demonstrate the evolution of airpower. Desert Storm confirmed for many the revolution in the application of airpower as a truly decisive instrument that made large force-on-force encounters obsolete. In other words, it created the perception that the Clausewitzian paradigm of massing forces at the decisive point was overtaken by Sun Tzu’s idea of deceptive attack, “nodal,” effects-based war, and the destruction of capabilities rather than people.⁶⁸ General Horner’s statement summarizes this idea: “The point to pay attention to is the *systems*, not the elements. No longer would I have to bomb every enemy surface-to-air missile site. If I could isolate and destroy the heart and brain of the Iraqi air defenses, then the arms and legs could not function, and attacking them would only use precious resources that would be better used in attacks on other targets...the tools, stealth and precision, would exploit the opportunities revealed by the complete knowledge of the Iraqi air defense system.”⁶⁹

Coming out of Desert Storm there were two schools of thought on the utility of airpower in future wars. The first school of thought maintained that airpower was the decisive factor in Desert Storm. It contended that airpower played the most important role in achieving the military objectives. The combination of stealth, precision, and standoff weapons produced a level of disruption on the Iraqi regime that had not been seen before.⁷⁰ As stated in the Gulf War Airpower Survey, some believed this represented a revolution in military affairs. The U.S. Army, however, left with a different perspective. From its viewpoint, the ground element was decisive. The air campaign was a prelude to buy time for ground forces to arrive in theater, attack some

⁶⁸ Richard P. Hamilton, “U.S. Air Power,” John Andreas Olsen ed. *Global Airpower*, (Virginia: Potomac Books, 2011), 111.

⁶⁹ General Horner quoted in Clancey, *Every Man*, 504.

⁷⁰ Olsen, *Air Warfare*, 197.

strategic targets, and soften the Iraqi forces for the ground offensive.⁷¹ Once the ground offensive started, Kuwait was liberated in four days. The differing service perspectives highlight the utility of Cote's theory on innovation. Many in both the USAF and the U.S. Army left Desert Storm believing each service was decisive to the outcome. The truth is probably that it was a combination of airpower and the land offensive, along with other elements of political and diplomatic actions, which led to Kuwait's liberation. The seeds of interservice rivalry, however, had again sprouted, and the disagreements leafed out in future conflicts.

One of the secondary effects of Desert Storm was the USAF changing its cultural identity from bomber- to fighter-oriented. Here we see Rosen's theory of innovation appearing. Before Desert Storm, the USAF was a traditionally heavy-bomber-centric organization structured around nuclear capabilities. The SAC bomber-centric culture dominated nearly every aspect of the organization. The experience in Vietnam showed that the USAF needed to widen its focus to one throughout the spectrum of war, instead of just the nuclear segment. Desert Storm demonstrated that the Cold War mentality of SAC did not apply in this new era. As a result, the USAF disestablished SAC and TAC and combined the fighters and bombers into a single command,—Air Combat Command—breaking down the intraservice barrier between “strategic” and “tactical” aircraft, integrating Air Force bombers further into the conventional role. An example of this is integration of bomber aircraft into the Fighter Weapons School, and the school's redesignation as the USAF Weapon School. As a result, the bomber force underwent a precision munitions upgrade in the 1990s that increased the nation's long-range strike capability.

Other innovations leading up to Desert Storm, such as stealth and precision munitions, improved the conventional capabilities of fighter aircraft to such a level that they could have strategic-level effects at a lower cost than mass formations of bombers. Desert Storm represented a paradigm shift in the USAF from bomber to fighter-oriented culture. The Desert Storm air campaign showed that, with air superiority, airpower could achieve strategic effects against an enemy without resorting to the use of nuclear weapons. Specifically, highly maneuverable and survivable fighter aircraft equipped

⁷¹ Olsen, *Air Warfare*, 198.

with precision munitions could produce strategic effects at a much lower cost than their strategic-bomber counterparts could. In this conflict, multirole jets such as the F-15E and F-16 destroyed Iraqi land targets and air targets in the same mission. As Rosen's theory proposes, innovation in the USAF was the product of a competition between sub-groups inside the organization.

In sum, the successful application of stealth technology in Desert Storm greatly influenced its continued development and role in future conflicts. The need for increased survivability against enemy AAA and SAMS had led to the development of stealth, and F-117s were able to employ successfully their stealth technology and tactics against Soviet-style IADS in Desert Storm. Moreover, combined with precision munitions, stealth reduced the number of aircraft required for missions in a contested—active IADS threat—environment, which reduced the amount of cost and risk involved. As Ben Lambeth details: “A typical non-stealth attack package in Desert Storm required 38...aircraft to enable 8 of those aircraft to deliver bombs on three aim points. Yet at the same time, only 20 stealthy F-117s simultaneously attacked 37 aim points successfully in the face of a far more challenging Iraqi surface-to-air threat.”⁷² This example highlights reduction in risk and cost that accompanied the USAF's technological development of stealth. The successful application of the F-117s in Desert Storm was only the beginning of the evolution in stealth technology.

Desert Storm represented the dawn of airpower's evolution from mass to precision with increasing emphasis on survivability. The air campaign did not overcome all the “frictions” of war described by Clausewitz. Friction is part of the nature of war, and will always be present. Desert Storm, however, showed how the innovative fusion of technology, training, and doctrine could act as force multiplier by setting the conditions for a quick and decisive victory against a conventional foe. The air campaign also brought to light how airpower had the ability to maintain continual pressure on an enemy from a safe distance, with increased lethality, selectively target with minimum collateral damage, react quickly, and disrupt an adversary's ability to control forces.⁷³ The success of Desert Storm influenced the direction of future USAF innovations in stealth, precision

⁷² Lambeth, *Transformation*, 156.

⁷³ Lambeth, *Transformation*, 303.

standoff weapons, and UAV development. Finally, airpower displayed an ability to save lives—enemy lives through minimized non-combatant fatalities, and friendly lives through technological advances such as stealth, precision, and UAVs. Naturally, this development influenced American society, politicians, and military leaders’ expectation of a near ‘bloodless’ war for future conflicts. Collateral damage became unacceptable. It did not take long for another conflict to test this idea.



Chapter 2

The New Way of War: U.S. Airpower in the Balkans

We set the bar fairly high when we fly more than 30,000 combat sorties and we don't lose one pilot. It makes it look as if airpower is indeed risk free and too easy a choice to make.

*General John P. Jumper
17th Chief of Staff of the United States Air Force*

There are certain dates in the history of warfare that mark real turning points. Now there is a new turning point to fix on the calendar: June 3, 1999, when the capitulation of President Milosevic proved that a war can be won by airpower alone.

*Sir John Keegan
Military Historian*

U.S. perception of airpower's decisive role in Desert Storm sustained USAF innovation in the post-Cold war era. This led to the first major test of U.S. airpower as the main coercive instrument in the conflicts in the Balkans. These continued to shape USAF technological and doctrinal developments that occurred due to increasing "western" societal and political pressures for a "bloodless" war. Pressures also developed in response to the perceived capabilities of American airpower to limit not only the number of friendly casualties, but civilian casualties as well. In other words, the success of airpower in Desert Storm established a new precedence for war. However, the conflict in the Balkans was not the same as Iraq.

The character of war in the Balkans differed from what the U.S. had faced in Desert Storm. The dispute in the Balkans civil war revolved around political, cultural, and economic disputes. Unlike the Desert Storm, where one country invaded the sovereignty of another, the Balkans conflict involved murky distinctions. This ambiguity created a high degree of uncertainty when developing operational and strategic objectives. The complex nature of the Balkans was indicative of the various conflicts that the U.S. found itself involved in after the Cold War. In order to meet these challenges, NATO airpower, led by the USAF, employed the full range of capabilities previously shown in Desert Storm.

This chapter will show the evolution of the USAF in response to the Dessert Storm experience, and the influence of international constraints on NATO airpower, led

by the USAF, in Operation Deliberate Force (ODF) and Operation Allied Force (OAF). Additionally, it will highlight the circular relationship between the innovations of the USAF and the enemy's adaptations to them.

The Evolution of Airpower leading up to the Balkans Conflicts

The end of the Cold War brought about uncertainty and ambiguity for the U.S. It was the first time in nearly forty years that the U.S. military did not have a strategic near-peer threat upon which to focus its effort. Having a known adversary provides a sense of clarity because it gives a sense of direction for the development of technologies, training, and doctrine to defeat a specific enemy on hypothesized battlefields. Losing the Soviet Union as a near-peer threat ushered in an era of uncertainty complicated by the challenge of preparing for a wide range of conflicts against enemies with various capabilities in different types of environments. How would the weapons developed for a specific enemy fare in the next war? What innovations needed to be made in order to ensure the same level of decisiveness seen in Desert Storm would exhibit in the next conflict? These were just a few of the questions the USAF had to answer in the wake of losing its longtime adversary, and coming out of Desert Storm with a renewed sense of vindication for the technological, training, and doctrinal innovations following Vietnam.

The character of warfare in the 1990s was anything but certain. The USAF, therefore, had to shift its thinking from the specific to the generic.¹ Generic strategic thinking led to the development of doctrine that addressed not only different kinds of war but also military operations other than war (MOOTW). For example, the USAF found itself enforcing no-fly zones in Iraq and providing humanitarian assistance throughout the globe immediately following Desert Storm. From 1991-1994, the USAF participated in 194 of these MOOTW types of operations.² The increase in American involvement in low-intensity conflicts, coupled with a reduction in military spending due to the departure of the Soviet threat, posed challenges for the USAF. For example, the diminished spending reduced the USAF from 39 to 20 wings, and cut the number of USAF fighter

¹ Keith Shimko, *The Iraq Wars and America's Military Revolution*, (New York, NY: Cambridge University Press, 2010), 129. Shimko does not specifically talk about the changing of USAF thinking specifically, but addresses the need for a change in strategic thinking from the specific to the generic.

² Alan Vick, David Orletsky, Abram N. Shulsky, and Joh Stillion, *Preparing the U.S. Air Force for Military Operations Other Than War*, Santa Monica, Cal., RAND, MR-842-AF, 1997, 16.

and attack aircraft almost in half from 1991-1996.³ The Desert Storm experience seemed to confirm, however, that technological improvements made airpower more capable than ever before, and could offset the reduced size of the USAF.

The successful application of stealth technology in Desert Storm greatly influenced its continued development and role in future conflicts. The need for increased survivability against enemy AAA and SAMS led to the development of stealth. F-117s were able to employ successfully their stealth technology and tactics against Soviet-style IADS in Desert Storm. Moreover, it reduced the number of aircraft required for missions in a contested—active IADS threat—environment, which reduced the amount of cost and risk involved. The successful application of the F-117s in Desert Storm was only the beginning of the evolution in stealth technology.

Another technological development that evolved from the success of the F-117 and in response to perceived Soviet advantage in the 1980s was the B-2. The B-2 began with the intent to conduct intercontinental precision attacks against targets around the world using stealth to ensure survivability in even the most highly contested environments. Additionally, the new bomber was revolutionary in its ability to carry over 10 times the payload with five times the unrefueled range of the F-117.⁴ The B-2 did not see operational use until OAF in 1999, but it did highlight a couple of features of USAF innovation in the Post-Cold War era. The B-2 represented the transformation of USAF technical innovation to reduce costs and risks using a technology that had better survivability capability and longer ranges. For the first time in its history, the USAF had the capability to engage multiple targets with one aircraft, as opposed to the past generations where multiple aircraft were required for one target. The B-2 embodied the ambition of USAF innovation in the 1990s. It could do more with less from farther away, while maximizing survivability.

Along with the inception of the new generation of aircraft came the evolution of munitions that increased survivability through higher levels of precision and distance.

³ Secretary of Defense William J. Perry, *Annual Report to the President and the Congress*, Washington D.C., Government Printing Office, March 1996, 179.

⁴ Benjamin S. Lambeth, *The Transformation of American Airpower*, (Ithaca, NY: Cornell University Press, 2000), 158-9.

Precision-guided munitions (PGMs) had displayed their potential during Desert Storm.⁵ Even though they made up less than 10% of the munitions used during the conflict, they exhibited the ability to take out targets that were small, hardened, or with high risk of collateral damage.⁶ However, the generation of PGMs used in Desert Storm required laser designation within visual range, which meant they would succumb to bad weather and other conditions of limited visibility. The Desert Storm experience using PGMs, to include the expensive TLAMS, led to the development of the Joint Direct Attack Munition (JDAM). The JDAM provided USAF and Navy aircraft the ability to hit land targets accurately in all weather and beyond visual range—out to 15 Nautical Miles.⁷ JDAMs solved the problems with PGMs during Desert Storm, but also reduced the vulnerability of aircraft operating in heavily contested areas. In the words of Keith Shimko, “JDAMs appeared to be the Holy Grail of aerial bombing—cheap, reliable, and accurate from far away regardless of weather.”⁸ The technological development of the JDAM solved several air-to-ground-related issues.

The development of the AIM-120 advanced medium-range air-to-air missile (AMRAAM) increased the USAF’s air-to-air effectiveness. The issues that plagued the air-to-air munitions of the Vietnam War (see chapter 2), coupled with the projections of the Soviet air-to-air threat, stimulated AMRAAM development in the mid-1970s.⁹ The AMRAAM represented the first “launch and leave” or “fire and forget” type of missile that used an active homing radar to track a target once it was off the rails.¹⁰ This meant that the pilot did not have to keep the target illuminated until the missile was able to guide itself home as they did with the previous semi-active missiles of the past. Furthermore, with this “fire and forget” capability, aircraft could engage multiple targets at once instead of having to illuminate one target until missile impact or miss. Not only

⁵ Laser guided bombs were utilized in the Vietnam War as well, but the lessons of Desert Storm had greater influence on their continued development.

⁶ Shimko, *Iraq Wars*, 94.

⁷ Bruce D. Berkowitz, *The New Face of War: How War Will Be Fought in the 21st Century*, (New York: Free Press, 2003), 96-7.

⁸ Shimko, *Iraq Wars*, 95.

⁹ Lambeth, *Transformation*, 163.

¹⁰ Launch and leave is a common phrase used in air-to-air engagements regarding a tactic in which an aircraft fires a missile and maneuvers away from the target. Fire and forget is another commonly used term for air-to-air engagement that means a weapon fired from an aircraft can guide itself to a target without any further input from the aircraft’s systems.

did the AMRAAM increase the odds of getting multiple kills in an engagement, it increased the effectiveness and range that a target could be engaged (beyond visual range), which enhanced aircraft and aircrew survivability. The AMRAAM represented just one more innovation that moved aircraft and aircrews farther from danger, increasing survivability and lethality. However, another technological development served to remove aircrews from hostile airspace altogether.

The utilization of unmanned aerial vehicles (UAVs) in Desert Storm had several implications for the evolution of airpower for the USAF. UAVs saw their first significant use during Vietnam where they flew over 3,000 sorties for surveillance and damage assessment.¹¹ UAVs, however, did not gain the same attention they received in Desert Storm and beyond.

UAV development became a priority for several reasons. First, they provided a smaller and cheaper option than any manned aircraft. One of the biggest advantages of UAVs was their decreased cost in money and lives. With their lower price tag, UAVs were more expendable and, unlike their manned counterparts, “you don’t have to send condolences to loved ones when a UAV gets shot down.”¹² Additionally, they had longer loiter times than manned aircraft. UAVs were not restrained by the human in the machine. Instead, their pilots sat in a remote location where aircrews could change out in the middle of a mission. UAVs continued the trend of innovations that minimized casualties in the air and on the ground. The Balkans conflicts tested these innovations.

Deliberate Force: The First Test of Post-Cold War American Airpower

The breakup of the Soviet Union brought about turmoil in Yugoslavia that eventually broke out into a civil war. Yugoslavia fell upon hard economic and culturally divided times in the late 1980s. These financial and nationalistic hardships set the stage for a breakup and internal struggle between several states that made up the former Yugoslavia. This led to a vicious civil war beginning in 1992 between multiple ethnic groups in Bosnia, reintroducing the world to ethnic cleansing.¹³ With its extensive news

¹¹ Thomas G. Mahnken, *Technology and the American Way of War Since 1945*, (New York: Columbia University Press, 2008), 113.

¹² Berkowitz, *Face of War*, 333-42.

¹³ Robert C. Owen, “Operation Deliberate Force, 1995,” in John Andreas Olsen ed., *A History of Air Warfare*, (Virginia: Potomac Books, 2011), 205.

coverage and parallels to the horrific ethnic cleansing memories of WWII, some type of outside intervention in the region was inevitable. The problem was that the two main peacekeeping organizations—NATO and the UN—struggled to arrive at a consensus on the appropriate level of intervention.

The complex situation in Bosnia required the unprecedented use of precision weapons. Among the NATO and UN countries, much political division existed over the causes of the war and appropriate ways to intervene. Because of these extensive divisions, many countries did not want to get overly committed to the conflict.¹⁴

The political sensitivities led to the use of precision airpower on a very limited scale to avoid civilian casualties. To complicate the matter further, air strikes required a “dual-key” approval process in which NATO and the UN would grant permission for military commanders to strike targets. This process could take hours to get the approval for targets that were normally on the move. The delay in approval led to many aircraft returning to base without striking a target. The situation on the ground in Bosnia remained unchanged, and a mortar attack in Sarajevo that killed 38 civilians on August 28, 1995, provided the trigger for ODF.

Due to the political situation in Bosnia, ODF operated under one of the most restrictive rules of engagement (ROEs) in the history of air warfare. The ROEs used in ODF restricted “targets that could be struck, proportionality of force, high sensitivity to collateral damage, and a phasing of the air campaign... controlled and cut off by civilian authorities at any time.”¹⁵ Additionally, General Michael Ryan imposed other restrictive special instructions that centralized control of the command of execution to the Combined Air and Space Operations Center (CAOC) Director and to himself only.¹⁶ Bombing was also restricted to visual identification of the target. The restrictive character of ODF allowed the USAF to demonstrate the strategic and tactical value of its recent innovations.

¹⁴ Owen, “Operation Deliberate Force,” in Olsen ed., *Air Warfare*, 207.

¹⁵ Owen, “Operation Deliberate Force,” in Olsen ed., *Air Warfare*, 215

¹⁶ Command of execution is the authority to give the approval for an action in the air. In this case, General Ryan and the CAOC director were the only people with the authority to give the command of execution to drop bombs on target.

Airpower innovations provided the option of conducting a quick and decisive offensive-intervention operation that minimized the risk of casualties. The political climate required intervention on a limited scale, and airpower offered the ability to intervene with minimal ground forces. The major bombing campaign—ODF—lasted a little more than two weeks. In that timeframe, NATO air forces attacked targets using 708 PGMs versus 318 unguided, for a 69:31 precision-to-unguided-munition ratio. When compared to Desert Storm's 8:92 ratio, ODF marks the first campaign in which precision instruments proved the weapon of choice.¹⁷ The increased usage highlights the improved reliability and effectiveness of precision munitions, which enabled the successful accomplishment of military and political objectives at a low cost.

Other technological innovations, such as the low-altitude navigation and targeting infrared for night systems, or LANTRIN pod, ensured the survivability of allied aircraft by allowing them to deliver their weapons from safer altitudes and distances. These innovations also enabled USAF airpower—under NATO—to attack the enemy through challenging weather conditions with precision that limited casualties and reduced the enemy's mobility and communication capability. Even when the Serbs adapted to these innovations by taking hostages and either threatened to kill them or chain them up to potential targets, such as communication towers, the NATO forces overcame most of these difficulties.¹⁸

The combined effects of airpower in this short period helped bring the Serbs to the peace table. Without the USAF-developed innovations, ODF success would have been much more difficult to achieve within the strict ROEs requiring the avoidance of civilian casualties. Without outside intervention, the ethnic cleansing would have likely continued. Airpower's ability to avoid a significant number of non-combatant casualties, while applying force to the Serbian leaders reduced the chance of negative publicity in the Western press.¹⁹ This helped keep the fragile coalition together and demonstrated to the world that the peacekeeping force meant to protect, not kill, innocent civilians. The

¹⁷ Owen, "Operation Deliberate Force," in Olsen ed., *Air Warfare*, 202.

¹⁸ Owen, "Operation Deliberate Force," in Olsen ed., *Air Warfare*, 211.

¹⁹ Owen, "Operation Deliberate Force," in Olsen ed., *Air Warfare*, 223.

peace, however, would not last for long. The next conflict in the Balkans would, again, rely on airpower to bring the Serbs to the peace table.

Operation Allied Force

In Operation Allied Force, airpower proved to be an essential component in the Serbian decision to comply with NATO demands. After a decisive victory in the conventional war in Iraq—one that had clearly defined objectives, a sound doctrine, and a centralized command structure—the U.S. found itself yet again in a Balkan war where airpower alone was relied upon to achieve success. From March 24 to June 9, 1999, NATO waged an air campaign against the former Yugoslavia in an attempt to stop the ethnic cleansing and other human-rights violations led by Serbian President Slobodan Milosevic. The NATO strategy used airpower to forcibly stop Milosevic from committing international crimes and come to a long-term peaceful solution.

However, the enemy also has a say. Milosevic's counter objective involved waiting out the air strikes in order to prolong the war and to cause civilian casualties, thereby splitting the fragile alliance arrayed against him.²⁰ Additionally, his military forces began to use tactics that offset the advantages that had previously worked for airpower in ODF and Desert Storm. OAF was the third time in the 1990s that airpower proved to be a key factor in determining the outcome in a medium-scale conflict.²¹

The massacre of 45 ethnic Albanian civilians in the village of Racak on January 15, 1999 by Serbian paratroopers triggered OAF.²² The following month saw multiple failed diplomatic attempts to persuade Milosevic to end his ethnic cleansing campaign against Kosovar Albanian citizens. After failed diplomatic efforts, a three-phased air campaign plan—OAF—intended to stop him, began on March 24, 1999.

The air campaign adopted a gradualist approach to reduce Serbian ability to continue the atrocities against Kosovars. The first phase focused on air strikes against IADS and command bunkers. The second phase ramped up to military targets below the 44th parallel, with the third phase moving to targets above the 44th parallel. President

²⁰ Barry Posen, "The War for Kosovo: Serbia's Political-Military Strategy," *International Security* Vol.24, No. 4 (Spring 2000), 51-2.

²¹ Benjamin S. Lambeth, *NATO's Air War for Kosovo: A Strategic and Operational Assessment*, (Santa Monica, CA: Project Air Force, RAND, 2001) 1.

²² Lambeth, *NATO's Air War*, 7-8.

Clinton stated three goals for the air campaign: “To show NATO’s serious commitment to peace in Kosovo, to deter further attacks by Yugoslav government troops, and, if necessary, to degrade the capacity of the Yugoslav armed forces.”²³ Furthermore, Supreme Allied Commander NATO Forces Europe, General Wesley Clark, instructed Commander, U.S. Air Forces in Europe, General John P. Jumper, to minimize collateral damage, avoid any friendly losses, and preserve the Yugoslav infrastructure.²⁴ Airpower relied on an accelerated use of precision, stealth, and standoff weapon systems to meet these objectives and force Milosevic to capitulate.

From the outset of the first mission, Airmen emphasized a strong effort to avoid casualties through means that maximized distance and precision. OAF began on the night of 24 March, 1999, with attacks carried out by TLAMS launched from Navy vessels in the Adriatic Sea and by conventional air-launched cruise missiles (CALCMS) launched by B-52s outside of Yugoslavian airspace. Following these attacks, air strikes against Serbian IADS throughout the country were executed to gain air superiority, an established necessary first step in USAF doctrine. These aircraft utilized a 15,000 ft. floor to minimize the chance of detection by enemy infrared SAMS and AAA.²⁵ A week of phase-I attacks to establish air superiority had no effect on Serbian behavior. In fact, the Serbian offensive against the Kosovars intensified. The escalating brutality on the ground led to NATO receiving political authorization to proceed to phase II of the air campaign.

Phase II of OAF differed very little in its ability to influence Serbian forces’ actions. First, the pace of operations was a fraction of Desert Storm’s. The nightly attack sortie rate was around 50, whereas, in Desert Storm, it was around 1000. Additionally, inclement weather during the second week forced many aircraft to return to base without dropping any ordnance on target. Finally, the Serbian land forces also presented a problem. They refused to mass and concealed their vehicles, based upon what they had learned from Desert Storm, where U.S. airpower destroyed Iraqi forces whenever they massed.²⁶ These challenges, combined with U.S. and NATO decision makers’ reluctance

²³ “Operation Allied Force: Day One,” *CNN*, March 25, 1999.

²⁴ Wesley K. Clark, testimony before U.S. Senate Armed Services Committee, October 21, 1999.

²⁵ Lambeth, *Transformation*, 183.

²⁶ Mason, “Operation Allied Force,” Olsen, *Air Warfare*, 234-5.

to expand the target set due to fear of inadvertent casualties, added to the ineffectiveness of the campaign through the first four weeks. With NATO's credibility and U.S. faith in airpower on the line, however, the situation soon changed.²⁷

Before moving to the transition of OAF, it is important to note that there was friction between the air component commander for OAF—Lt General Michael C. Short—and General Clark regarding the targeting strategy. The commander of naval forces in OAF noted, “There was a fundamental difference of opinion at the outset between General Clark, who was applying a ground commander’s perspective...and General Short as to the value of going after fielded forces.”²⁸ The experience in Desert Storm had influenced USAF service doctrine, which stated, “Aerospace power is usually employed to greatest effect in parallel, asymmetric operations. This includes precision strikes against surface forces, information attacks against command and control systems, or precision strikes against infrastructure and centers of gravity.”²⁹ Air Force leaders, therefore, preferred to start OAF by overwhelming parallel air strikes against Milosevic and his inner circle in Belgrade. General Clark, however, chose a gradualist approach that looked similar to the strategy taken in Vietnam. Clark did not make this decision without reason, but was bound to the limits imposed by coalition warfare. Specifically, if Clark unleashed the air forces on Belgrade from the start, he risked losing coalition members who were looking for “something more measured.”³⁰ The strategy debate went to the heart of USAF doctrine at the time, but was not the only interservice issue to arise during the start of OAF.

Within the opening days of OAF, General Clark had requested a contingent of AH-64 Apaches be deployed to the combat zone in what was referred to as Task Force Hawk. The idea behind this request was that the Apaches would be used to give a better “close-in capability” against enemy tanks and vehicles than fixed-wing aircraft that had been restricted to operating at 15,000 feet and above.³¹ There were two major issues with

²⁷ “Hope for the Best, and a Spot of Golf,” *The Economist*, April 3, 1999, 9.

²⁸ Quoted in Lambeth, *Transformation*, 221.

²⁹ Air Force Doctrine Document 2, *Organization and Employment of Aerospace Power*, USAF, September 28, 1998, 6-7.

³⁰ Wesley K. Clark, *Waging Modern War: Bosnia, Kosovo, and the Future of Combat*, (New York: Public Affairs, 2001), 124.

³¹ Lambeth, *Transformation*, 207.

this deployment. First, the U.S. Army does not deploy Apaches by themselves, but as an organic asset of two fielded corps. Deploying these helicopters independent of U.S. ground forces went against Army doctrine, which states that the Apache “never fights alone...Attacks may be conducted out of physical contact with other friendly forces,” however, they must be “synchronized with their scheme of maneuver.”³²

The other issue with Task Force Hawk was that the Army leadership did not cede tactical control over their Apaches to the OAF air component commander in an all-air operation, with every U.S. and coalition air mission overseen by the air component commander. Additionally, the Army’s V Corps Commander—Lieutenant General John Hendrix—did not allow any of the Apache missions to appear on the Air Tasking Order.³³ The issue of control became so serious that it made its way to the Joint Chiefs of Staff to be resolved. In the end, Task Force Hawk caused more problems than solutions, and hinted at a growing rift between American land and air forces.

The second part of OAF’s campaign as it transitioned from a limited military-targets-only focus to an expanded target list focused on political and military elites. The plan was to make Milosevic and his power base an example to the rest of the world. Aerial attacks, such as when cruise missiles took out Milosevic’s political party headquarters and media stations in Belgrade, began to occur frequently.³⁴ These attacks against political infrastructure affected the political machine that supported Milosevic. Finally, an attack on Belgrade’s electrical grid, with a precision guided munition, in late May severely affected Serbian air defense and brought the war into the homes of the Serbian population.³⁵ This marked a culmination in the gradual escalation in targeting of NATO airpower against Milosevic and his conspirators. The increased attacks on Milosevic’s political and civilian support system eventually led to his decision to accept the NATO peace plan and end the 72-day air war.

The legacy of OAF goes beyond whether or not airpower alone can coerce an enemy. OAF demonstrated the evolution of the airpower instrument as shaped by the

³² Army Field Manual 1-112, *Attack Helicopter Operations*, Headquarters, Department of the Army, 2 April, 1997, 1-1.

³³ The Air Tasking Order is a preplanned schedule of all air missions covering a certain period.

³⁴ Mason, “Operation Allied Force,” Olsen, *Air Warfare*, 240.

³⁵ Lambeth, *Transformation*, 189.

civilian and political masters that it serves. American airpower's evolution as an instrument of precision made this operation possible. Innovations in precision, stealth, and information allowed NATO to execute an air campaign that was unlikely to cause casualties on a scale that would elicit negative world opinion and lead to the operation's failure. The success in Desert Storm and ODF had increased U.S. faith in and reliance on airpower to force Milosevic to the peace table.

OAF saw an evolution in the use of precision munitions. In Desert Storm, only ten percent of aircraft could deliver precision munitions. By the time that OAF began, ninety percent had this capability.³⁶ It alone was pivotal to the intervention approach taken by the NATO forces to ensure minimal civilian casualties. Precision innovations such as the JDAM with its all-weather, high altitude (40,000 ft.) capability and \$14,000 price tag "outperformed laser-guided bombs and cruise missiles that are 10 to 70 times more expensive, and became the weapon of choice for the most sensitive targets."³⁷ Of the approximately 28,000 munitions dropped, only about a third (29 percent, ~7,000) were actually guided munitions.³⁸ However, due to wind-corrected munitions, targeting-pod upgrades, and other technological advances, the unguided bombs were much more accurate than they had been in the past. Innovations such as these enabled air forces to execute the war within the restrictions and resulted in no more than 500 civilian casualties in Serbia and Kosovo.³⁹ Although OAF saw the USAF's unprecedented use of precision weapons, other innovations hinted at more survivable options for the future.

Other accomplishments during OAF highlighted the evolution of the USAF's increased survivability. The USAF's B-2 made its debut in a major operation, flying a 30-hour round trip from Whiteman AFB, Missouri. It was the first manned aircraft to penetrate the Serbian IADS on the initial night when Navy TLAMS and B-52 CALMS were launched against key targets from outside the country.⁴⁰ Furthermore, the B-2 overcame the weather obstacles that plagued other coalition aircraft by operating effectively at higher altitudes and utilizing the GPS-guided JDAMS through the

³⁶ Shimko, *Iraq Wars*, 121.

³⁷ Quoted in Shimko, *Iraq Wars*, 121.

³⁸ Shimko, *Iraq Wars*, 123.

³⁹ Lambeth, *NATO's Air War*, 219.

⁴⁰ Dale Eisman, "Over the Balkans, Its Beauty vs. the Beast," *Norfolk Virginian-Pilot*, April 26, 1999.

weather.⁴¹ The accomplishments of the B-2 represented the first true long-range global-strike capability, making the USAF's "global reach, global power" a reality.⁴²

Another major sign of this evolution in OAF was the increased use of UAVs. Although their attrition rates were high—up to 50%—unmanned systems made a significant contribution to the overall effort in OAF with relatively little cost. UAVs in OAF provided battle-damage assessment, target information and verification, and refugee monitoring. They offered a low-cost option to fly in a contested environment. UAVs could fly below the weather within SAM threat rings with no possibility of aircrew losses. Even if they were shot down, their \$3.2 million price tag was far less than their manned counterparts and UAV losses caused little if any political concern or embarrassment. By the end of the war, UAVs equipped with laser designators for precision munitions hinted at their potential to become the ultimate low-risk airpower option with a future strike capability.⁴³

A final, lesser-known accomplishment plays a major role in military operations today. OAF saw the first use of offensive cyber operations. Desert Storm saw cyber operations, but they were limited to a defensive posture through the interception and monitoring of cyber traffic among Iraqi officials. In OAF, however, General Jumper confirmed the first use of cyber offensive operations through the manipulation of Serbian air defense computers. Cyber operators successfully input false targets into the Serbian air defense system, increasing the chances of survivability for coalition aircraft. Cyber debuted as an offensive weapon, allowing Airmen to engage in the fight from safe distances while increasing the chance of friendly-force survival.⁴⁴ This capability would eventually lead the USAF to recognize the value of creating a separate command focused solely on the cyber domain. These innovations resulted in the successful conclusion of OAF, but they also brought other less positive effects.

The USAF made several advances in precision, stealth, and information warfare, but at a cost to allied interoperability. First, none of the coalition partners in the NATO

⁴¹ Paul Richter, "B-2 Drops Its Bad PR in Air War," *Los Angeles Times*, July 8, 1999.

⁴² Global reach, global precision was the USAF's position statement developed in 1989 by then Secretary of the Air Force Donald B. Rice. See Donald B. Rice, *The Air Force and U.S. National Security: Global Reach-Global Power* (Washington, DC: Office of the Secretary of the Air Force, June 1991).

⁴³ Mason, "Operation Allied Force," Olsen, *Air Warfare*, 249-50.

⁴⁴ Lambeth, *Transformation*, 200.

air campaign had invested anywhere close to the amount the USAF had on precision. In fact, only the U.S. and a few British and French aircraft had the capability to drop precision munitions. Moreover, the U.S. maintained the only all-weather precision capability, which meant that other aircraft were less effective because “there was 50-100% cloud cover 72% of the time, and only 21 of 78 days had good overall weather. In all, 3,766 planned sorties, including 1,029 characterized as ‘close air support,’ were aborted due to weather.”⁴⁵

In addition, issues related to a lack of secure air-to-air-communications capability made target and aircraft information vulnerable to enemy interception. Some friendly parties lacked a standard identification-of-friend-or-foe system and radar-warning receivers on their aircraft. The lack of these pieces of equipment in a large-scale air war could have had serious consequences; aircraft can be misidentified and/or fail to identify friendly or hostile systems themselves. The large disparity in capability led to other issues such as split operational planning, operational control of certain assets (B-2, F-117, and Tomahawks for example), and unity of command. In this “allied war,” the large capability gap could have resulted in friendly losses if there had been substantial enemy air activity.⁴⁶ Fortunately, that was not the case, but the enemy did prove resilient in other areas.

The asymmetry in U.S. capability was not limited to allies, and extended to the Serbian forces as well. The difference in capability between the coalition and Serbian forces was extremely lopsided, even more than Desert Storm, but that did not stop the Serbs from learning how to capitalize on their strengths. Precision was one of the many areas of advantages for the NATO forces, but precision without a clear target is not of much use. The Serbs were aware of U.S. precision capabilities displayed in Desert Storm, and from their experience in ODF. As a result, they dispersed their forces, camouflaging vehicles and comingling with the local population to make detection and targeting nearly impossible. Additionally, they set up decoys for tanks and trucks that successfully fooled NATO airpower assets. These tactics, however, were overcome with

⁴⁵ Bruce R. Nardulli et al., *Disjointed War: Military Operations in Kosovo 1999*, (Santa Monica, CA: RAND, 2002), 48.

⁴⁶ Mason, “Operation Allied Force,” in Olsen ed., *Air Warfare*, 245-7.

the cooperation of Kosovo Liberation Army forces (KLA). Much like Iraqi Forces in Desert Storm, when the Serbs massed, they made excellent targets for airpower. When the Serbs dispersed, they were vulnerable to KLA forces. This small land force and airpower innovation hinted at the winning combination that was used in Afghanistan in 2001.

The Serbian actions show the circular relationship between USAF innovation and the enemy adapting to its limitations. In this case, the Serbian forces made themselves into smaller and harder-to-find targets. They also used non-combatants as protection against allied forces, because they knew that attacks resulting in civilian casualties would stimulate negative press and a possible break in the political alliance. Therefore, unable to match the technological superiority of the USAF, the Serbs resorted to innovative methods to overcome their technological and numerical inferiority. This became the trend for belligerents in future operations against U.S. airpower.

Conclusion

The air campaigns in Bosnia and Kosovo provided an opportunity for USAF innovations to prove their effectiveness in conflicts in the Post-Cold war era. Some of the biggest developments in precision, stealth, UAVs, and cyber warfare proved their worth in the Balkan conflicts. Innovations in these areas allowed for an operation in which airpower was the sole coercive instrument. However, these innovations did not develop in a political vacuum, but were the product of political and societal pressures to avoid casualties.

The pressure to avoid casualties—civilian and military—in OAF was higher than in any previous U.S. conflict. From the start of the conflict, any sensitive target had to secure approval all the way up to the President.⁴⁷ This served to decrease the likelihood of collateral damage, which could result in negative media coverage. Even though a couple of negative setbacks occurred, such as the accidental bombing of the Chinese embassy, ameliorating the impact of the atrocities committed against the Kosovars overrode the occasional bombing error. Additionally, land-force options could have made the images of dead Serbian soldiers, bombed towns, refugees, and NATO body bags more likely. Therefore, public opinion and support for airpower remained high,

⁴⁷ Lambeth, *Transformation*, 204.

especially since the number of casualties incurred was substantially smaller compared to the number that would have occurred through the exercise of a land-force option.⁴⁸

OAF also revealed the growing split between air and land forces. A trend of Cote's interservice rivalry between the Army and the Air Force played out in a few instances. First, there was the disagreement of targeting strategy between Clark and Short. As stated previously, Clark used gradualism in order to maintain the support of the alliance, while Short believed that gradualism was the antithesis of the appropriate way to employ airpower. The other issue was the curious deployment of Apaches by Clark in a long-range air war. The total cost and risk of the Apache deployment, separate from its fully fielded corps, far out-weighed the benefit of involving them in OAF. If Desert Storm was the ultimate in joint operations, OAF was the start of a rift between the two services...one that was further exposed on the battlefields of Afghanistan.

The experiences in ODF and OAF seem to reaffirm the idea that airpower could win wars quickly and decisively at a reduced cost. These claims were partially unclear due to the other diplomatic and military considerations surrounding the conflicts, such as the possibility of a coalition ground offensive and Milosevic's loss of Russian support. What is clear, however, was the ability of U.S. airpower to supply a low-cost option in politically ambiguous conflicts like those in the Balkans. Nevertheless, it is equally important to understand the ironic nature of airpower strategy, the more precise and lethal U.S. airpower has become, the more its enemies attempt to offset its effects through asymmetrical means. This reciprocal effect shaped the strategic context for which the U.S. found itself at the threshold of the twenty-first century.

⁴⁸ Mason, "Operation Allied Force," in Olsen ed., *Air Warfare*, 250-1.

Chapter 3

Enduring Freedom: The First American War of the 21st Century

Collateral damage concerns [indeed] became more important than mission success. But then, in part, mission success depended on avoiding collateral damage.

*General Chuck Horner
USAF (ret.)*

The air war enabled the ground war to succeed.

*Donald Rumsfeld
Secretary of Defense, 2001-2006*

The events on September 11, 2001 (9/11) changed the United States and the world. The terrorist attacks on the Twin Towers and the Pentagon prompted the USAF to utilize airpower in a new way. Part of the unexpectedness of the 9/11 attacks related to the terrorist use of airpower in a way that fell outside the accepted paradigm of military operations. This first major strike on U.S. soil by external actors since Pearl Harbor used domestic commercial aircraft as a weapon. At the time, the U.S. military's structure prepared for an attack coming from outside the U.S. by a threat that would leave reasonable time to react. Therefore, the 9/11 attacks transformed the world from the post-Cold War era to the post-9/11 era. Once thought of as a minor nuisance, terrorism and the effort to fight it became the major focus of the early 21st century. The USAF played a significant role in this new era.

The new terrorist threat presented a change in the normal warfare paradigm, and forced USAF innovation. Terrorists wore no uniforms and knew no state boundaries. They made targeting difficult by blending in with the local population, dispersing into small units, and using several other forms of deception in order to offset the advantages of a superior foe. Therefore, the terrorists presented no traditional strategic targets that the USAF had proven so successful against in Iraq and the Balkans. Furthermore, as terrorists do not represent a government or state, sending a military force to seek them out and defeat them is a politically sensitive affair. Because of its politically sensitive nature, the requirement to keep casualties to a minimum in Operation Enduring Freedom (OEF) was again high. The U.S. relied heavily on the airpower in conjunction with special

operations forces and indigenous fighters to project power thousands of miles away against a resourceful enemy. This chapter addresses the initial military action in Afghanistan, focusing on the air campaign and the continuing evolution of airpower as shaping and shaped by the new character of conflict and the growing requirement to minimize casualties.

Operation Enduring Freedom: The Afghan Model

Following the terrorist attacks of 9/11, President Bush called for a plan of attack against the most apparent threat, the Taliban and al Qaeda in Afghanistan. Even though no one claimed immediate responsibility for the attack, it soon became apparent that the terrorist organization al Qaeda, led by Osama bin Laden, had been behind the attacks. In his address to the nation on 9/11, President Bush said the United States would “make no distinction between the terrorist who committed these acts and those that harbor them.”¹ Afghanistan and the country’s ruling government, run by the Taliban, provided a safe haven for bin Laden and al Qaeda. The initial response focused on Afghanistan and relied on an airpower-dominated campaign to destroy al Qaeda and Taliban terrorists.

While no script existed for this type of situation, the initial plan, developed in 26 days, revolved around precision-standoff weapons and a ground force only if needed. The terrorist threat presented a unique challenge. Furthermore, the U.S. had very few, if any, strategic targets of interest. The main center of gravity was the terrorists themselves. U.S. political leaders, therefore, emphasized the importance of avoiding noncombatant casualties and collateral damage to signal to the world that the war was against the Islamic terrorists, and not the Muslim world at large.² With the terrorists hiding in caves and amongst the civilian population, any large U.S. conventional ground-force option was ruled out. The situation dictated an innovative approach that utilized airpower’s precision with minimal ground forces. The plan developed into the “Afghan Model.”

This hybrid of combined warfare constituted an innovation in the application of airpower shaped by the changing character of conflict. Not long after the 9/11 terrorist attacks, there were several options for military response. The Joint Chief of Staff

¹ Michael Grunwald, “Terrorist Hijack Four Airliners, Destroy World Trade Center, Hit Pentagon: Hundreds Dead,” *Washington Post*, September 12, 2001.

² Benjamin S. Lambeth, *Air Power Against Terror: America’s Conduct of Operation Enduring Freedom* (Santa Monica, CA: RAND, 2005), 60.

proposed a traditional invasion that would require a lot of time and effort to build up the necessary forces. Additionally, it would make the U.S. look like an invader instead of liberator, alienating the Muslim community at large and producing further resentment of America. The only agency with experience in Afghanistan, the CIA, responded with a plan that would utilize CIA operatives and special operations forces (SOF) in conjunction with local friendly forces—the Northern Alliance—all supported by airpower.³ The plan could be quickly executed, required a small footprint of troops on the ground, and demonstrated an innovative way to integrate precision airpower with friendly land forces. Moreover, it decreased the potential for a high number of casualties and collateral damage through its smaller footprint and having people on the ground that could discriminately call in air strikes. This model served as the primary plan going into the OEF campaign.

OEF started less than a month after the 9/11 terrorist attacks, on October 7, 2001. Unlike Desert Storm, there was not a large build-up of American forces. However, OEF began with a textbook model of doctrine developed from Desert Storm: gain air superiority, knock out enemy command and control, and then proceed with a ground attack.⁴ The Taliban represented a less capable opponent than Iraq or Serbia. U.S. air forces degraded its air defenses enough by the end of the first day that only half the number of U.S. aircraft was required on the second day. By the tenth day of the operation, the air campaign shifted from fixed targets to targets of opportunity, such as troop concentrations and vehicles. This next phase of operations ushered in a new use of airpower in modern war.⁵

The shift in emphasis began with the insertion of SOF operatives into Afghanistan. SOF units, combined with airpower, provided the force multiplier needed by the vastly outnumbered Northern Alliance against the Taliban. “SOF-directed precision airpower transformed the U.S. campaign by radically improving the ability of

³ See Gary C. Schroen, *First in: An Insider's Account of How the CIA Spearheaded the War in Terror in Afghanistan* (New York: Ballantine, 2005).

⁴ George Friedman, *America's Secret War: Inside the Hidden Worldwide Struggle Between American and Its Enemies* (New York: Broadway, 2004), 169.

⁵ Benjamin S. Lambeth, “Operation Enduring Freedom, 2001,” in John Andreas Olsen ed., *History of Air Warfare*, (Washington D.C.: Potomac Books, 2010), 261.

airpower to destroy the Taliban's fielded forces."⁶ The Taliban tried to offset this capability by dispersing its forces. By dispersing, however, they could no longer conduct conventional offensive operations against the Northern Alliance. The fusion of ground forces with precision airpower negated the Taliban's ability to carry out its main mission of fighting off rebel forces.⁷ This innovative process allowed friendly Afghan forces to quickly overtake Mazar-i-Sharif and Kabul. The Taliban forces, however, continued to resist and maintained control over Kandahar. Kandahar, their last stronghold, became the focus of U.S. air strikes.

The fight for Kandahar occurred mainly through the air with more than two months of precision air strikes. By December 1, the USAF executed air strikes within ten miles of Kandahar with such precision that minimum collateral damage occurred. An example of this is the U.S. precision bombing of three known al Qaeda houses without causing any damage to two UN burlap tents directly adjacent to them.⁸ A week later, two months after the start of OEF, the U.S. had the Taliban on the run and accomplished many of the campaign goals.⁹ However, even with the successes enabled by precision air strikes, the Taliban fought back with any means possible.

As was the case in Desert Storm, ODF, and OAF, the Taliban tried to take advantage of instances of collateral damage. After the opening night of air attacks, the Taliban's ambassador to Pakistan claimed the air strikes resulted in up to 20 Afghan civilian casualties. The Taliban recognized the Western sensitivity to casualties, and incessantly tried to exploit it throughout the conflict. It later claimed that the first 25 days of U.S. bombings killed 1,500 Afghans.¹⁰ The U.S. adamantly denied these allegations, and expressed the intent to avoid civilian casualties.¹¹

The Taliban also began to adapt its tactics to exploit the collateral-damage issue and mitigate the effectiveness of precision airpower. The Taliban learned what the U.S.

⁶ Richard B. Andres, Craig Willis, and Thomas E. Griffith, "Winning with Allies: The Strategic Value of the Afghan Model," *International Security* Vol. 30, No. 3 (Winter 2005/2006), 134.

⁷ Andres, *Winning with Allies*, 133.

⁸ John Pomfret, "Kandahar Bombs Hit Their Marks," *Washington Post*, December 10, 2001.

⁹ Some of the campaign goals accomplished were to remove the Taliban from power, destroy al Qaeda infrastructure in Afghanistan, and form a post-Taliban interim government. See Lambeth, *Air Power*, xix.

¹⁰ William Branigin and Doug Struck, "U.S. Intensifies Bombing," *Washington Post*, November 1, 2001.

¹¹ Dan Balz, "U.S. Strikes Again at Afghan Targets: American Told to Be Alert to Attacks," *Washington Post*, October 9, 2001.

would and would not bomb, such as residential areas, religious buildings, and mosques. Secretary of Defense Donald Rumsfeld reported that the Taliban was strategically placing its vehicles and equipment close to many of these same safe areas to offset the advantage of airpower.¹² By doing this, the Taliban completely disregarded the law of armed conflict by putting Afghan civilians in danger.¹³

In the end, however, the combination of indigenous land forces, aided by U.S. SOF personnel and airpower, proved to be too much for the Taliban. By December 18, after nine weeks of continuous combat operations, the aerial bombing came to a halt. Within the next couple of months, the character of war transitioned from a fusion of advanced aerial technology and land forces to a policing action. The Taliban retreated into the mountains and caves in an attempt to escape into Pakistan. The U.S. toppled the Taliban regime with minimal land forces and moderate airpower instead of resorting to a conventional mass invasion. This meant fewer American casualties, which had been a continuing trend in Iraq, Bosnia, and Kosovo. Historian Richard Cohen best summed this idea up when he wrote, “It is now absolutely clear that air power works. The evidence has been accumulating in recent years—the Gulf War, Kosovo—but it has taken the war against the Taliban to show just what can be done from the wild blue yonder. The use of air power coupled with proxy fighters—the Northern Alliance—has meant that American casualties have been minimal. We have our fingers crossed on that one, but even when that changes—the zero casualty rate that stood for some weeks will still have been a major accomplishment.”¹⁴

The success in the early stages of OEF concealed a growing problem between the U.S. Army and the USAF, which manifested in Operation Anaconda. In the fall of 2002, a combination of U.S. and Afghan land forces attempted an assault on the remaining Taliban forces high in the mountains of East Afghanistan. The objective was to kill or capture any remaining Taliban or al Qaeda forces in order to remove any threat to the fragile Afghan government. Overseeing the planning and execution of Anaconda was Army Major General Franklin Hagenbeck, who was designated as the commander of the

¹² Steve Vogel, “Over Afghanistan, Gantlets in the Sky,” *Washington Post*, October 29, 2001.

¹³ Lambeth, *Air Power*, 99.

¹⁴ Quoted in Hallion, “U.S. Airpower,” John Andreas Olsen ed. *Global Airpower*, (Virginia: Potomac Books, 2011), 130.

Combined Joint Task Force. The task force was made up of the 10th Mountain and 101st Airborne divisions combined with SOF and indigenous Afghan forces. Although the organization was labeled as “joint,” no U.S. service was represented in it other than the Army.¹⁵ Therefore, at the onset, the largest commitment of U.S. ground forces since Desert Storm began without adequate planning and coordination with supporting air elements. Anaconda proved to be an experience of relearning the importance of effective ground-and-air coordination—a lesson believed to have already been learned in Desert Storm.

Anaconda may have begun as an Army-centric operation with little joint planning, but it quickly changed as the mission became more complex. In an early indicator for the operational need to integrate fixed-wing airpower, a flight of U.S. Army Apache attack helicopters attempted to insert troops into the area of operations. Within minutes, the troops found themselves surrounded and had to call the Apaches back to provide suppressive fires. The Apaches were unable to assist because of the high density of enemy fire. Furthermore, upon the Apaches’ return to base they were inoperable and found themselves out of the fight until they could be repaired.¹⁶ After having inserted only half of the planned forces and with seven Apaches out of the fight, Anaconda changed from “an operation focused primarily on land power to an operation increasingly dependent on Air Force, Navy, and later Marine assets.”¹⁷

Even though airpower was integrated only after the operation had started, it was able to bring critical firepower against enemy forces, while minimizing friendly casualties. As airpower adjusted to the unexpected close-air-support demands of Anaconda, Air Force Combat Controllers and Joint Terminal Attack Controllers controlled the delivery of hundreds of munitions from every attack platform with no instances of fratricide and no friendly losses to enemy fire.¹⁸ To put the importance of this into context, Anaconda saw “the greatest number of precision munitions dropped into

¹⁵ Lambeth, *Air Power*, 168.

¹⁶ Lambeth, *Air Power*, 180-181.

¹⁷ Major Mark G. Davis, “Operation Anaconda: Command and Confusion in Joint Warfare,” (master’s thesis, School of Advanced Air and Space Studies, Maxwell Air Force Base, AL, June 2004), 113.

¹⁸ Lambeth, “Operation Enduring Freedom, 2001,” in Olsen ed., *Air Warfare*, 267.

the smallest geographic space in the history of air warfare.”¹⁹ Additionally, the integration of ground and air forces produced an innovation. Occasionally, Army forces pinned and held down al Qaeda troops, preventing them from retreating, while aircraft came in to destroy them with precision-guided munitions. In this example, the normal relationship between air and land forces was reversed, with airpower acting as the supported element.²⁰ The experience demonstrated the value in planning and coordinating with all the elements of the joint force. Fortunately, the integration of land and airpower, effected at the last moment, was able to avert operational disaster and produce a successful outcome.²¹

Airpower Innovation in OEF

The most consequential innovation in OEF related to doctrine rather than technology. The fusion of SOF forces with airpower in hunter-killer operations proved successful in routing the Taliban in nine weeks. The experiences in Iraq, Bosnia, and Kosovo helped produce this achievement. In each operation, the enemy eventually adapted to airpower’s advantage, usually with some form of deception. However, in each case, a land force aided in overcoming the enemy’s deceptive tactics. Historian Ben Lambeth believes that “the integration of Air Force terminal attack controllers with U.S. and allied SOF teams on the ground was arguably the single greatest tactical innovation of the war.”²² Having forces on the ground to provide accurate intelligence to U.S. aircrews delivering precision munitions was vital, because even the most precise weapon is worthless without good target information.

A product of experience, the SOF/airpower combination also provided the most logical means of quickly responding to the terrorist threat. As potential foes continue to pursue asymmetrical ways to offset advantages airpower brings, the reliance on precision munitions may continue to rise. Conversely, the requirement for small mobile teams on the ground working in concert with air assets will continue to grow, especially if political and societal expectation of low casualties continues.

¹⁹ Quoted in Lambeth, “Operation Enduring Freedom, 2001,” in John Andreas Olsen ed., *A History of Air Warfare*, (Washington, D.C.: Potomac Books, 2010), 268.

²⁰ Lambeth, “Operation Enduring Freedom, 2001,” in Olsen ed., *Air Warfare*, 267.

²¹ Lambeth, *Air Power*, 200.

²² Lambeth, “Operation Enduring Freedom, 2001,” in Olsen ed., *Air Warfare*, 271.

The air campaign in Afghanistan sustained the trend of the increased reliance on precision-guided munitions. American airpower proved more accurate than ever before. For example, in OEF nearly every strike platform was JDAM-capable. Furthermore, precision munitions accounted for nearly 60 percent of the total munitions dropped.²³ With this increased reliance on precision, however, came an increase in expectations. For the U.S., the expectation for precision continued to rise from Desert Storm to OEF. Therefore, as the USAF became more precise, the requirement for avoiding casualties steadily rose.

As the tolerance for casualties has decreased, the political requirement for the discriminate use of force has risen. In Desert Storm, restrictions hindered missions from time to time. In the Balkans, internationally imposed rules of engagement were even more restrictive. However, in OEF the need to avoid casualties was so high that the U.S. Air Forces of Central Command created a special collateral damage reaction cell in the combined air and space operations center to investigate any instances of civilian fatalities or collateral damage.²⁴ The cell did not prevent casualties, but filled a need to gather information quickly when a collateral-damage situation occurred and provided explanations as required. This is an important development because the Taliban's asymmetric counter to offset airpower's precision involved delegitimizing it by exaggerating or creating collateral-damage incidents, which forced the U.S. to try to prove its innocence. In Afghanistan, propaganda created a serious perception-management problem for the U.S. As the U.S. continues to find itself in low-intensity conflicts, fighting to control the narrative may continue to be an issue.

The range of air operations represents another airpower development that continued to trend upward. Because Afghanistan is a land-locked country, U.S. aircraft had to travel up to several thousand miles from other countries and aircraft carriers to the target area. OEF highlighted the U.S. ability to conduct long-range operations farther away from the battle than ever before. In fact, OEF saw the longest fighter sortie (15.8 hours) and the longest combat sortie (44.3) hours flown.²⁵ The increased use of aerial

²³ Lambeth, "Operation Enduring Freedom, 2001," in Olsen ed., *Air Warfare*, 270-271.

²⁴ Lambeth, *Air Power*, 343-344.

²⁵ Lambeth, *Air Power*, 137, 89.

refueling enabled the increase of duration and range of sorties. In Desert Storm, aerial refueling missions constituted 12 percent of the total sorties flown, while in OAF, it was 20 percent, and in OEF, it rose to 27 percent.²⁶ The ability to fly at extended ranges decreased the likelihood of aircraft taking off and landing in a hostile area, thereby, increasing their odds of survival. Furthermore, the great distances traveled demonstrated the evolution of American airpower's combat endurance and flexibility by testing its boundaries.

OEF introduced cutting-edge unmanned aerial system (UAS) technology. The air campaign saw the first operational use of the RQ-4 high-altitude UAS that provided long-range surveillance. Furthermore, the MQ-1 Predator, which made its debut in OAF as a surveillance-only platform, now had the capability to fire Hellfire missiles. This was another important development because it guaranteed the safety of the aircrew. These two developments, a high-altitude, long-range sensor and a weapon-equipped UAS, demonstrated interwar innovation that further ensured the safety of aircrew.

OEF saw an unprecedented intelligence, surveillance, and reconnaissance (ISR) umbrella. The worldwide sensor and communications activity had two major impacts. First, it enabled the fusion of sensor and shooter at a level never seen before. The time it took information to go from a sensor to the shooter reduced from hours to minutes. This increased the level of information and communication to both the shooter and leadership in the CAOC. However, the multisensory ISR umbrella also allowed for greater control at the highest levels. The transmission of near-real-time information, sent to the aircraft and to the CAOC, meant that there could be greater discrimination in targeting.

Centralized control of targets was stricter than in the Balkans, because technology had proven that it could achieve precise results. For example, any target capable of producing even one civilian casualty, if attacked with less than perfect precision, required the approval of U.S. Central Command, the CAOC, and sometimes civilian leaders in Washington.²⁷ Political casualty aversion became a point of emphasis in the rules of engagement for the purpose of perception-management. Additionally, as the evolution of the kill chain reduced to minutes, the principal-limiting factor was the human element.

²⁶ Lambeth, "Operation Enduring Freedom, 2001," in Olsen ed., *Air Warfare*, 271.

²⁷ Lambeth, "Operation Enduring Freedom, 2001," in Olsen ed., *Air Warfare*, 272-3.

The human approval process could delay the prosecution of time-sensitive targets or targets of opportunity.

The anticipation of casualties resulted in individuals failing to nominate targets for fear of disapproval from higher headquarters. In other words, there were instances where mission accomplishment took a backseat to collateral-damage avoidance.²⁸ Moreover, enhanced connectivity promoted increased control of the command of execution. As stated previously, the ability for civilian leadership in Washington to approve targets was greater than ever before. Live feeds transmitted from the UASs into the COAC allowed senior military leaders to observe live battlefield images and communicate directly with the shooter. With great power, however, comes great responsibility.

Few countries enjoy the ability to attack with high precision and near-real-time communication. In a low-intensity conflict, where perception-management can have more of an impact than a bomb, due care and process should take precedence in order to form perceptions that promote rather than hinder the war effort. From this experience, it appears that managing collateral-damage is easier than trying to handle its unintended consequences. Therefore, the challenge for the U.S. going forward will be to balance collateral-damage considerations with mission accomplishment.²⁹ With the increase in great power, the responsibility of the U.S. to limit casualties in war has become an essential factor in lower-intensity conflicts.

Conclusion

The terrorist attacks of September 11, 2001 changed the United States and the world. They caught the U.S. by surprise, and moved the world from the post-Cold War era into an era defined by war against terrorism. By attacking the U.S. homeland directly, the terrorist threat went from a minor nuisance to the major focus of the U.S. for start of the 21st century. The U.S. then traveled great distances to bring the fight to the attackers. The USAF played a major role in the campaign to bring down the Taliban and al Qaeda operatives in Afghanistan.

²⁸ Lambeth, "Operation Enduring Freedom, 2001," in Olsen ed., *Air Warfare*, 273

²⁹ Lambeth, *Air Power*, 348.

Like its predecessors, Operation Enduring Freedom was the true test of the innovations coming out of the post-Cold War era. The extended distances traveled by joint airpower were greater than ever before. A typical bomber mission from Diego Garcia lasted anywhere from 12-15 hours, while carrier-based aviation and other land-based missions out of the Persian Gulf lasted up to 10 hours.³⁰ These distances, facilitated by the increased use of aerial refueling, enabled continual pressure on the enemy. Moreover, the widespread availability of precision munitions and fusion of data from ISR platforms expedited the execution of targets. During Allied Force, only the B-2 was capable of carrying the JDAM, but in OEF, nearly every strike platform had this capability. The increased precision capability, however, came with greater scrutiny and responsibility.

As the level of precision increased on a scale never seen before, casualties and collateral damage had come under more intense public and political scrutiny. Concerns for avoiding casualties saw a steady increase from Desert Storm to OEF. At the same time, airpower's capability to discriminate targets had increased the public and political imperative to avoid casualties. This new reality escalated a firmer set of rules of engagement in order to minimize collateral damage.

OEF, like Desert Storm and Allied Force, suggested a transformation in the future of warfare. The days of mass infantry and armor clashes on the battlefield where heavy casualties were expected, again, seem to be less likely against adversaries that lack the capability to challenge U.S. ability of standoff, precision-air attack. Even with the ability to challenge that capability, the successful integration of small land forces with standoff precision platforms and sensors had proven successful in these lower-intensity conflicts. In fact, there were zero USAF aircraft lost to enemy AAA, SAMs, or aircraft in the first two years of the operation, and of the 18 total U.S. service member deaths only two were Airmen, while 15 were Soldiers or Marines.³¹ While there is no guarantee the

³⁰ Lambeth, *Air Power*, 358.

³¹ Defense Casualty Analysis System, "U.S. Military Casualties – Operation Enduring Freedom Casualty Summary by Month and Service," *Department of Defense* (April 14, 2017), https://www.dmdc.osd.mil/dcas/pages/report_oef_month.xhtml.

U.S. will always avoid scenarios needing large ground forces, as long as it controls the air, the likelihood of this circumstance is greatly enhanced.³²

The initial planning oversight and near disaster that was averted in Operation Anaconda seemed to suggest some evidence in OEF to support Cote's theory of innovation. Specifically, the U.S. Army's attempt to accomplish the operation without coordinating with the other services for support could have been interpreted as its way to get into the fight. It should also be noted that General Hagenback did assume that an attached Air Force liaison officer was communicating the details of the operation to the air component.³³ Coming out of the post-Cold War era, however, much of America's power projection was accomplished mainly with airpower combined with small land forces, such as in Serbia and Kosovo. The Army, therefore, had not been utilized on a major scale since Desert Storm. Operation Anaconda provided the opportunity for it to get into the fight and demonstrate its importance in this new era. Again, Cote's theory appears in Anaconda and seems to suggest that there may still be some competition between the two services over how each defined victory, as demonstrated in the Army's lack of coordination with the air component in Anaconda.

Rosen's theory, conversely, does not do as well in explaining innovation in the conventional period of OEF. For the USAF, victory was still defined in the context of fighter-bomber operations where the enemy was identifiable, and airpower could be used to attempt to convince the enemy's leadership that continued resistance would be too costly.³⁴ The initial part of OEF did little to change the mindset of those in the USAF. Therefore, there was not a strong push for change inside of the service. The transition to the asymmetric conflict that defined OEF after Anaconda did create competition inside, and outside, the service for the best way forward. That, however, falls outside of the scope of this chapter and will be addressed later.

Finally, the experience in OEF highlighted two trends that continued during the subsequent three-week conventional campaign against Iraq a year later. First, it showed that target scrutiny and avoiding casualties had become the American way of war. In

³² Lambeth, *Air Power*, 364.

³³ Lambeth, *Air Power*, 266.

³⁴ Jeffery J. Smith, *Tomorrow's Air Force: Tracing the Past, Shaping the Future*, (Bloomington and Indianapolis: Indiana University Press, 2014), 142.

lower-intensity conflicts, where the enemy lacks the military capacity to impede air operations, the social and political requirement to minimize casualties will be high. USAF innovation, therefore, will continue to be motivated by this requirement. Secondly, as the speed and spread of information and communication continues to increase, senior leader's control over the command of execution will remain high. This will especially be the case in any instance where a high risk of casualties exists. These two themes might be among the biggest takeaways in the war against the Taliban and al Qaeda in Afghanistan.



Chapter 4

Iraqi Freedom: From Overwhelming Force to Overmatching Power

By any fair standard of even the most dazzling charges in military history...the present race to Baghdad is unprecedented in its speed and in the lightness of its casualties.

*Dick Cheney
Former Vice President of the United States*

Iraqi units were being targeted with precision air attacks before they could pose a threat to advancing U.S. land forces or were within range of the cameras of embedded news media.

*General Chuck Horner
USAF, Retired*

Operation Desert Storm ended with the U.S. achieving its limited objective of liberating Kuwait by removing the Iraqi forces. However, with Saddam Hussein left in power as Iraq's dictator, the U.S. was left to enforce UN no-fly zones over Iraq for twelve years after Desert Storm. Coming out of Desert Storm, Hussein and his senior military leaders convinced themselves that they had actually won the war because they were still in power and had their military mainly intact. Because of this, Hussein continually violated UN-imposed sanctions and backed down at the last minute when the U.S. came in with force. With the multiple violations of sanctions and the impact of 9/11 on U.S.'s new perception of defense, another war against Iraq was likely.

The second war in Iraq was not a repeat of Desert Storm. Desert Storm was a limited war fought for the objective of liberating Kuwait by using airpower to set the conditions for a swift land campaign. Operation Iraqi Freedom (OIF), however, involved more of what the authors of the AirLand battle had originally envisioned: a combined-arms campaign by American, British, and Australian air, land, and maritime forces.^{1,2} Unlike Desert Storm, OIF featured the simultaneous use of air, land, and sea power, where U.S. land forces drove from Kuwait to defeating the Iraqi Republican Guard and overtaking Baghdad in three weeks. As with the first war, however, airpower would again set the conditions for success in the three-week conventional campaign.

¹ Benjamin S. Lambeth, *The Unseen War: Allied Air Power and the Takedown of Saddam Hussein* (Annapolis, MD: Naval Institute Press, 2013), 1.

² Combined arms is the term that signifies the integration of the air, land, and maritime components.

The air campaign that enabled the success of the first three weeks demonstrated the importance of integrating real-time information, precision, and combined arms in achieving operational objectives. The combination of continual information surveillance, and reconnaissance (ISR) coverage coupled with an unprecedented number of precision, standoff weapons, integrated with a rapidly advancing ground component, quickly overran the Iraqi resistance with very few casualties. This success, however, did not just happen, but was a product of the cumulative wartime experiences from Desert Storm through OIF.

From Desert Storm to OIF there was a slow evolution in the U.S. military from utilizing overwhelming force to overwhelming power. This progression can be seen in several trends that came together in OIF. First, the evolution of mass to precision is evident in the increased reliance on and development of precision-guided munitions. These weapons not only limited collateral damage, but also decreased the number of sorties required to destroy targets. Second, the development of airborne and space-based sensors, which provided information vital to targeting the enemy and avoiding casualties, were more capable than ever before. The fusion of air and space sensors across the military services enabled the coalition to deliver discriminating effects with devastating accuracy. Finally, the efficacy of joint employment significantly improved over previous conflicts. Because of the relationships established between the service leaders in the conflict in Afghanistan, little infighting occurred over whom was being “supported” and who was “supporting.” These three elements combined to enable the unprecedented success of the U.S. forces in OIF against the conventional Iraqi forces.

Of direct importance to this work is the air campaign of the conventional component of OIF. The OIF air campaign provides the final demonstration of the USAF’s evolution from mass to precision focus, with increased survivability and casualty avoidance as key motivators of innovation. This chapter will briefly cover the air campaign through the first three weeks of OIF and detail some of the many innovations that occurred in the conflict.

The Air Campaign

From the very start, key differences existed between OIF and the first Iraqi war. Since Desert Storm, the U.S. had been in multiple conflicts and had its first foreign attack on American soil since Pearl Harbor. The impact of 9/11 on defense strategy and policy cannot be overstated. At the time, Vice President Dick Cheney hinted at the shift in American defense strategy and policy from reactive to proactive: “We had certain strategies and policies and institutions that were built to deal with the conflicts of the 20th century. They may not be the right strategies and policies and institutions to deal with the kind of threat we know face.”³ This change in military posture led to the U.S. into its first preventive war to stop an assessed future threat rather than respond to a hostile act.⁴ However, the U.S. faced an enemy that was a shell of its former self.

Compared to Desert Storm, the coalition forces went into the second Iraq War with a greater advantage. The American military was leaner due to defense spending cuts that followed Desert Storm, but it was equipped with better technologies and weapons made in defense-suppression, all-weather capabilities, and battle-space awareness. Iraq, on the other hand, had seen its forces eroded from the combined effects of Desert Storm and a decade of economic sanctions and air attacks. Historian Williamson Murray and retired Army General Robert Scales describe the state of Iraqi military as having “had virtually no military capabilities left after an air war of attrition lasting over twelve years.”⁵ The state of the Iraqi military was not comparable to that of its former self before 1991. Historian John Keegan best summarizes this in his assessment, “In February 1991 a very large high quality Western army confronted an equally large but low quality Iraqi army...In March 2003 a much smaller but even higher quality Western army confronted an Iraqi army degraded and enervated by its earlier defeat and by twelve years of isolation from its foreign sources of supplies.”⁶ The Iraqi army went from over a million

³ Quoted in Susan Page, “War May Realign World and Define a Presidency,” *USA Today*, March 17, 2003.

⁴ Page, *Define a Presidency*. Page notes that this will be the first preventive war in U.S. history, the first time the nation has attacked without being struck first.

⁵ Williamson Murray and Robert H. Scales, *The Iraq War: A Military History* (Cambridge, MA: Belknap Press of Harvard University Press, 2003), 183.

⁶ John Keegan, *The Iraq War* (New York: A.A. Knopf, 2004), 127.

strong to only about 350,000 over the decade following Desert Storm.⁷ Therefore, the beginnings of this new campaign against Iraq was much different from the first episode.

While “no-fly zone” enforcement operations, Northern and Southern Watch, had successfully kept Iraq’s air defenses in check, a new airpower effort took place in June of 2002 that ensured air superiority for the coalition forces at the onset of OIF. Operation Southern Focus set out to gain and maintain air superiority, degrade Iraqi tactical communications, use information operations to achieve strategic and tactical surprise, and eliminate surface-to-surface antiship missiles to prep the battlefield.⁸ In this operation, the rules-of-engagement for Southern Watch were relaxed to allow crews greater discretion in reacting to “threatening” actions by Iraqi air-defense systems. As an example, if a surface-to-air-missile (SAM) radar went active during a mission, the pilot was allowed to strike that SAM. Southern Focus also displayed signs of innovation.

Its missions not only monitored no-fly-zone compliance, but also completed the intelligence site picture. F-16CJs, normally used for suppression of enemy air defenses, were tasked to find sites and photograph, but not to attack, them. F-16s, operating as pure ISR with a defensive backup, comprised a new concept, and required a “different mindset” than what fighter pilots were used to doing before the operation.⁹ This technique allowed Allied leaders to monitor changes in high-value equipment before the invasion. Additionally, the use of predators to bait Mig-25s into action was another sign of innovation, which allowed coalition forces to learn enemy aircraft’s radar-performance parameters and additional details about the Iraqi command-and-control systems.¹⁰ Furthermore, this action had all the benefits of a manned flight with no chance of friendly casualties. By March 18, 2003, Southern Focus had set the stage for OIF through 21,736 sorties, 349 targets hit, and 651 surface-to-air engagements completed, during which no manned aircraft were shot down.¹¹

OIF was scheduled to start on 21 March, 2001, but on 19 March, the CIA had intelligence reports that Saddam and his sons were at a Baghdad retreat called Dora

⁷ Lambeth, *Unseen War*, 59.

⁸ Michael Knights, *Cradle of Conflict: Iraq and the Birth of Modern U.S. Military Power* (Annapolis, MD: Naval Institute Press, 2005), 257.

⁹ Major Anthony Roberson, an F-16 weapons officer as quoted in Lambeth, *The Unseen War*, 67.

¹⁰ Lambeth, *The Unseen War*, 69.

¹¹ Lambeth, *The Unseen War*, 70.

Farms. This was two days after President Bush's ultimatum for Saddam and his sons to leave Iraq had passed. The opportunity to eliminate Saddam and thereby win the war with a bomb proved too tempting.¹² With time of the essence, two F-117s flew to the targets carrying 2000-pound penetrating laser- and satellite-guided bombs. The attack hit the target and was immediately followed up with conventional air-launched cruise missiles launched from B-52s at a safe standoff range, followed by a wave of Navy tomahawk land attack missiles launched from the Arabian Gulf and Red Sea.¹³ Despite all the munitions hitting their target, Saddam and his sons were not at that house.

Iraq responded with a missile attack into Kuwait. Radar from the USS *Higgins* detected the launch and promptly delivered a firing solution to an Army Patriot PAC-3 SAM that destroyed the missile in flight. Moments later, a pair of loitering F-16s destroyed the site that launched the missiles.¹⁴ The joint coordination in response to the Iraqi reaction pointed to the true joint nature of this conflict.

Unlike Desert Storm, OIF started with ground forces moving in on 20 March. There had been SOF teams inserted into Iraq days before the formal ground invasion, but the main land force entered Iraq just before dawn on 20 March. The OIF air campaign began the next day. The D-day plan called for near simultaneous air and land wars to maximize confusion and keep the enemy off-guard. In some respects, the plan resembled concepts from Boyd's OODA Loop (Ch. 1), in that it relied on speed, precision, and lethality in order to take away the Iraqi's ability to form a coherent response. The speed at which the U.S. forces were able to move put the Iraqis on a defensive, almost reactionary, stance from the beginning. In fact, U.S. land forces were moving so fast that their own logistics could not keep up.¹⁵ The ground forces moved through southern Iraq with little resistance, while the air campaign focused on the few approved strategic targets.

The images on television of the air attacks on Baghdad, the "shock and awe," were actually more limited than in Desert Storm. In planning for the air campaign "the strategic strikes were narrowed to three specific categories: 59 'leadership' targets...112

¹² Keith Shimko, *The Iraq Wars and America's Military Revolution*, (New York, NY: Cambridge University Press, 2010), 148.

¹³ Lambeth, *The Unseen War*, 77.

¹⁴ Lambeth, *The Unseen War*, 79.

¹⁵ Shimko, *Iraq Wars*, 153.

communications targets; and 104 offices and facilities of the ruling Baath Party and Saddam's secret services."¹⁶ The limitation on strategic targets was partly due to the fear that civilian casualties might alienate the Iraqi populace that would soon be under American control. The other reason for the limitations was to ensure that Iraqi infrastructure stayed intact for the country's post-war reconstruction.¹⁷ The U.S. administration wanted to make sure that the Iraqis knew that the war was against Saddam and his regime, not the Iraqi people. Saddam, on the other hand, believed that the U.S. would use airstrikes, not a ground force, for coercion. Therefore, he developed a strategy similar to that of Milosevic in Kosovo, hunker down and wait for the international community to force the coalition to end the air campaign.¹⁸

The planners for the air campaign went to extreme measures to avoid collateral damage. From the beginning of the planning for the campaign, the Bush administration placed a heavy emphasis on avoiding collateral damage. The planners at U.S. Central Command (CENTCOM) put together a team of aircrews, intelligence analysts, lawyers, and public affairs officers to respond to incidents and Iraqi allegations of collateral damage. Moreover, every target was heavily scrutinized to include the proportionality of the weapon to the target, the bomb's fusion, angle of attack, and even the time of day the attack would occur—all to minimize the chance of enemy casualties.¹⁹ However, the focus on minimizing casualties was not limited to non-combatants.

After several days of attacking strategic targets and with complete air superiority, the air campaign shifted to the targeting of Iraqi fielded forces. A combination of close-air-support, interdiction, and strike-reconnaissance-and-coordination (SCAR) missions were flown to eliminate any resistance and increase the speed of the ground advance towards Baghdad. As the land forces raced toward Baghdad, about 150 aircraft were in orbit over Iraq waiting to conduct attacks against targets as requested from ground controllers embedded with the land forces. The strike aircraft attacked Iraqi tanks, artillery, anti-aircraft artillery, and Republican Guard barracks in order to reduce Iraqi

¹⁶ Stephen Budiansky, *Air Power: The Men, Machines, and Ideas That Revolutionized War, from Kitty Hawk to Iraq* (New York, NY: Penguin Books, 2005), 437.

¹⁷ Lambeth, *Unseen War*, 113.

¹⁸ Williamson Murray, "Operation Iraqi Freedom, 2003," in John Andreas Olsen ed., *A History of Air Warfare*, (Virginia: Potomac Books, 2011), 284.

¹⁹ Lambeth, *Unseen War*, 113-114.

combat capability by at least 50 percent.²⁰ These missions were so effective that when the Army's 3rd ID arrived at Baghdad, the Iraqis could muster only 12 tanks, the remnants of the Iraqi Republican Guard, to come out and fight. As one of the only tank-on-tank battles of the war, it ended quickly.²¹ Furthermore, CENTCOM estimated that more than 1,000 of the 2,500 Iraqi tanks were lost to air strikes during the campaign.²² The continual precision bombing from the start of the campaign enabled the land forces to get to Baghdad at an unprecedented pace with minimal friendly casualties.

In three weeks, the combined effort of allied airpower and the speed of the land force proved too much for the Iraqi military to overcome. At the strategic level, the joint campaign crushed every facet of the Iraqi military, while securing Iraqi oil fields that were a vital source of income for the reconstruction, and keeping most of the infrastructure intact. Furthermore, OIF brought about the close of Operations Northern and Southern Watch. The former lasted almost 12 years and the latter 10.5. The experience showed that combined arms could be a force multiplier under the right conditions. After the war, Secretary of Defense Rumsfeld suggested the U.S. military had finally transitioned from overwhelming force to overmatching power.²³ Lambeth's observation of the OIF conventional experience best highlights this idea, "The twenty-one-day experience showed that overwhelming force is not just about numbers and that jointness can be a true force multiplier when pursued and applied with commitment and conviction by all players from the most senior echelons on down."²⁴

The Evolution of Airpower in Iraqi Freedom

OIF's use of an unprecedented number of precision munitions decreased the rate of friendly and enemy casualties. When compared to Desert Storm, the total number of precision munitions used during the conventional portion of OIF was about the same. The difference was that precision munitions made up about 8 percent of the total munitions expended in Desert Storm, while for OIF it was closer to 70 percent. With all

²⁰ Lambeth, *Unseen War*, 113.

²¹ Evan Thomas and Martha Brandt, "The Secret War," *Time*, April 1, 2003.

²² Michael R. Gordon, "Tightening a Noose," *New York Times*, April 4, 2003.

²³ Committee on Armed Services United States Senate, "*Lessons Learned*" *During Operation Enduring Freedom in Afghanistan and Operation Iraqi Freedom, and ongoing operations in the United States Central Command Region*, (2003), 14.

²⁴ Lambeth, *Unseen War*, 142.

the strike aircraft precision-capable, the number of targets that one aircraft could attack increased. OIF, therefore, required fewer sorties than Desert Storm. During the first three days of OIF, when the air campaign focused on strategic targets, 80 percent of the munitions were precision-guided. Furthermore, with over 29,000 munitions dropped and nearly 25,000 targets destroyed with pinpoint accuracy, precision attack had reached a new high. The real testament to the effect of precision is that, in three weeks of fighting, only 108 American and 27 British military personnel lost their lives, and somewhere between 4,000-8,000 civilian fatalities occurred, compared the 148 killed during the six-week Desert Storm campaign.²⁵

The GPS-guided JDAM saw extensive use in OIF, permitting Airmen to engage targets at safer distances. The JDAM changed the way that bombs were dropped because aircraft no longer needed to fly to a specific spot, within specific parameters to successfully employ the weapons. Pilots simply needed to get within range of the target, input the coordinates; and, once launched, the bomb guided itself to the target. For that reason, it is considered a “fire-and-forget” weapon, which meant that coalition aircrews could launch from the greatest distance away from the target because they did not have to continuously mark their target as they would with laser-guided bombs. Additionally, JDAMs could be dropped from higher altitudes, decreasing the chance of being shot down by anti-aircraft artillery. A CAOC planner noted that the evolution of precision munitions “allowed us to achieve mass that had not been possible before on a large scale.”²⁶

The mass application of precision brought about effects-based thinking. Commonly referred to as effects based operations, these types of operations are driven by a desired effect, versus target destruction or sortie count. It is something that cannot be understood through traditional means of measurement. For example, the objective of airpower in OIF was to reduce Iraqi combat *effectiveness* by at least 50 percent. The question then becomes, how does one measure effectiveness? In Vietnam and other wars of the past, effectiveness was measured by body count, missions flown, or bombs

²⁵ The friendly casualty numbers were referenced in Lambeth, *Unseen War*, 180. The Iraqi numbers were gather from Iraq Body Count on 1 March 2017 <https://www.iraqbodycount.org/database/>

²⁶ Quoted in Lambeth, *Unseen War*, 295.

dropped. In OIF, however, this was accomplished without killing 50 percent of the fielded forces, flying thousands of missions, or dropping more bombs than any other war. Instead, the cumulative effects of air, land, and maritime power caused the Iraqi forces to diminish in effectiveness by 50 percent. The effects reflected Boyd's strategic paralysis, because the U.S. forces remained one-step ahead of the Iraqi leadership. As stated previously, this put the Iraqi leadership on a reactive posture, instead of proactive.

Contrary to previous war paradigms, effects-based operations did not require the maximum use of force, but focused on using the minimum. In this regard, one could say that the U.S. ability to execute effects-based operations was a new paradigm of "overmatching power" versus the old paradigm of "overwhelming force." Effects-based thinking was a concept that emerged during Desert Storm. However, the ability to execute with the ease seen in OIF was a product of innovations in precision and the efficacy of joint-force employment.

From the ISR umbrella, to the space assets that provided critical GPS information to both air and ground units, the integration and connectedness of coalition forces was better than ever before. The ability to quickly exchange information enabled combat aircraft to deliver on-demand discriminating effects throughout the battlespace. The Afghanistan experience produced the closeness of the services. The relationships established between the service chiefs and senior military planners in Afghanistan created an unprecedented mutual support between air and ground forces. Vice Adm. Arthur Cebrowski, who was head of the Pentagon's Office of Force Transformation at the time, stated "a new air-ground system has come into existence where you no longer talk in terms of one being supported and the other being supporting. That would be like asking if the lungs are in support of the heart or if the heart is in support of the lungs. It's a single system."²⁷ In respect to that observation, air and land operations were seamlessly integrated due to several innovations that eased the flow of information from troops to aircraft and vice versa.

The USAF's investment in air liaison officers and joint terminal attack controllers (JTAC) was a critical force enabler. After the third day of the conflict, the air situation quickly turned from air superiority to air dominance, and aircraft were able to focus on

²⁷ Quoted in Amy Svitak, "Force of the Future," *Army Times*, November 25, 2002.

Iraqi fielded forces. JTACs embedded with the ground units helped avoid casualties. Just as in OEF, having a terminal controller on the ground able to pass timely information to aircraft, while receiving potentially life-saving information from the aircraft, created a huge force multiplier.

This combination presented the same dilemma for the Iraqi forces as it had for the Serbs in OAF. When the Iraqis tried to camouflage and disperse their forces to avoid airstrikes, the coalition land forces overwhelmed them. However, when the Iraqis massed their forces, they made easier targets for coalition airpower that could be called in by the JTACs. Therefore, the employment of JTACs embedded with the land component was a force multiplier that aided in avoiding friendly casualties, while also minimizing enemy casualties through friendly forces on the ground with “eyes on” the target.

The joint integration also indicated a doctrinal innovation. The air operations during OIF saw SCAR missions really come into play. These missions doctrinally blurred the lines between the classic close air support (CAS) and air interdiction (AI) missions, where CAS is in direct support of the land forces, and AI is indirect by focusing on interdiction of military forces beyond the fire support coordination line (FSCL). SCAR missions were “on-call” types that went beyond just supporting the friendly land force. These missions were directed by air and land terminal attack controllers against the enemy, independent of the land forces. This airpower evolution was described by a USAF doctrine expert:

“In the last update to Air Force Doctrine Document 2-1.3, *Counterland Operations*, we added a short section describing the generic term ‘attack’ as applying to those counterland missions that do not fall under the traditional mission rubrics of CAS or air interdiction...I think it will be a while before we get this into joint doctrine, but the momentum is there.”²⁸

The evolution in application of this doctrine directly and indirectly supported the land forces by destroying the enemy army before it could threaten friendly land forces. It enabled the land force to quickly advance, while avoiding casualties due to large force-on-force conflict.

The integration of air and land forces did not always go well. Even before OIF began there were differences between the air and land component commanders on how

²⁸ Quoted in Lambeth, *Unseen War*, 297.

the campaign should begin. The initial plan laid out by General Franks was labeled “90-45-90”: 90 days to move forces into theater, 45 days of aerial bombardment combined with SOF to set the conditions for a ground offensive, then 90 days of joint operations to bring down the Hussein regime. General Moseley,—CENTCOM’s Air Component Commander—however, wanted 10-14 days, at the very minimum, of air-only operations to destroy the Iraqi IADS before the ground offensive began. He was specifically concerned about the air defenses around Baghdad, which had essentially remained untouched since the end of Desert Storm. Conversely, Lt. General Paul Mikolashek—CENTCOM’s Land Component Commander—wanted to take the Iraqis by surprise through an unexpected ground offensive to secure the Rumaila oil fields. The oil fields were a major source of income for Iraq and were considered key to its transition in a post-Hussein policy. Furthermore, he believed a ground offensive would catch the Iraqis by surprise since Desert Storm had started with an air-only option. It was reported that Franks believed the air option exceeded the campaign’s needs, and the land option would take too long. The air and land components adapted to Franks original plan, but it is important to point out that there were still differing views between the services on the best strategy for victory. As the war was waged, there were other areas of divergence between the two components.²⁹

Even though the air-land integration was significantly better in OIF, there were still instances of competition between the Air Force and Army cultures on their preferred methods of conducting operations. One example played out with results similar to Operation Anaconda in OEF. On March 23, 2003, the Army attempted to use organic rotary-wing airpower in a deep-assault mission against elements of the Iraqi Republican Guard without preparation of the battlespace by fixed-wing aircraft. The results were the same as in Anaconda, nearly every Apache was badly damaged by Iraqi surface fire, and one was shot down.³⁰ The core of the issue was the lack of coordination with the air component. Five days later, the Army planned another Apache deep-strike-attack operation. However, this time suppression attacks, on-call close air support, and flank support were coordinated with fixed-wing aircraft, and things went more smoothly.

²⁹ Lambeth, *Unseen War*, 21-22.

³⁰ Lambeth, *Unseen War*, 99.

Fortunately, the failed Apache mission was the only major Army mistake during the entire war.³¹

In another instance of perceived service rivalry General McKiernan, the land V Corps Commander, restricted the use of airpower to allow the Army to control a larger portion of the battlespace and use organic fires for what was doctrinally reserved for USAF assets. McKiernan extended the fire support coordination line (FSCL)—the distance in front of the forward line of troops where organic and joint fires require coordination—uncharacteristically deep. Specifically, he moved the FSCL out from the normal range of about 20 miles to 84 miles. One of the major issues with this is that the Army's organic fires can affect targets out only to about 20 miles. Therefore, by extending it out to 84 miles, he created a sanctuary for the enemy because it inhibited the operations of fixed-wing assets. As stated in Joint Publication 3-0, *Doctrine for Joint Operations*, "placement of the FSCL should strike a balance so as not to unduly inhibit operational tempo while maximizing the effectiveness of organic and joint force interdiction assets."³² The Air Force Doctrine Document 2-1.3, *Counterland Operations*, further details that the FSCL "should be placed where the preponderance of effects on the battlefield shifts from the ground component to the air component. In this way, the FSCL placement maximizes the overall effectiveness of the joint force, and each component will suffer only a small reduction in efficiency."³³ The failure to honor the recommendations of joint doctrine and extending the FSCL beyond the effective range of organic fires seems to hint at a rivalry over which service was key to victory.

The requirement to avoid casualties also played a role in the innovation of munitions. The experience in both Afghanistan and Iraq brought a pressing need to reduce the size of precision munitions in order to allow for the engagement of more targets by a single aircraft. The decreased size in warhead provided the additional benefit of decreasing the chances of collateral damage. The GBU-39 small diameter bomb was the product of this requirement. Additionally, the CBU-107 passive-attack weapon was

³¹ Lambeth, *Unseen War*, 254.

³² Joint Chiefs of Staff, *Doctrine for Joint Operations*, Joint Publication 3-0 (Washington, D.C.: Department of Defense, September 10, 2001), III-44.

³³ Secretary of the Air Force, *Counterland Operations*, Air Force Doctrine Document 2-1.3 (Maxwell AFB, AL: Air Force Doctrine Center, September 11, 2006), 69.

developed with the intent to disable non-hardened targets such as storage facilities by releasing thousands of steel and tungsten penetrating rods. The weapon could disable the target without actually destroying the building, thereby minimizing even unwanted collateral damage. Finally, developments in munitions increased the standoff range, allowing aircraft to engage targets at safer distances. The joint standoff weapon, or JSOW, and the joint air-to-surface standoff missile (JASSM) are two examples of this. The former could be released twenty miles away from targets such as air-defense systems that posed a threat to friendly aircraft.³⁴ The strategic dilemma with these weapons was, however, as they got smaller and more precise, the enemy found innovative ways to adapt. Again, Clausewitz's dictum of war as a human endeavor, where the enemy has a say, still held true.

Finally, as the conventional war began to wind down, and it became apparent that the coalition forces knew the Iraqi positions better than their own commanders did, the Iraqi forces adopted a new strategy that would define the rest of OIF.³⁵ Many of the Iraqi forces simply threw down their arms and removed their uniforms, as the war seemed all but lost. The Fedayeen, an elite paramilitary unit, countered the mass use of precision and standoff munitions by dispersing and blending in with the civilian population. Herein lies the strategic dilemma.³⁶ As U.S. weapons became more precise and enabled better survivability through distance, enemies adapted by making themselves smaller targets and blending in with civilians in an attempt to increase collateral-damage costs. The Iraqis believed that the collateral damage would adversely affect public support, as it had in Vietnam. Therefore, a circular relationship began to develop, where determining friend from foe became much harder. The enemy offset the advantage of precision by working outside the traditional paradigm of war by blending with civilians. By utilizing this tactic, they had effectively devalued the advantage of precision, because without accurate target information, a precision bomb is as good as a "dumb" bomb. As this situation continued to develop, OIF quickly transitioned from conventional to irregular warfare, from a traditional operation to a policing action.

³⁴ Lambeth, *Unseen War*, 232-233.

³⁵ Budiansky, *Air Power*, 438.

³⁶ Shimko, *Iraq Wars*, 155.

Conclusion

Operation Iraqi Freedom was a remarkably asymmetric conflict that saw the fruition of AirLand Battle played out against the ideal enemy once more. The war was characteristically different from Desert Storm. The U.S. had increased its technological and force-employment capabilities, while decreasing in numerical strength, and Iraq was a shell of its pre-Desert Storm self. It was ill-equipped, poorly manned, and unprepared for the sort of conflict it would soon encounter. However, due to the taunting nature of Saddam's UN sanction violations, and the effects of 9/11 on U.S. security policy, the inevitable war ensued.

From the start, airpower set the conditions for success. Twelve years of enforcing no-fly zones in operations Northern and Southern Watch, coupled with operation Southern Focus, helped shape the speed and ease in terms of casualties that defined the three-week march to Baghdad. Martin Van Creveld agreed that "the three-hundred mile, three week campaign that cost the Americans 138 deaths" (only 20 of which were Airmen) was "a walkover."³⁷ This was enabled by the combination of the mass use of standoff-precision weapons, continual ISR coverage, and joint integration of air, land, and maritime forces unlike anything seen before. Victor Davis Hanson's assertion supports the idea that "by any fair standard of even the most dazzling charges in military history, the Germans in Ardennes in the spring of 1940 or Patton's romp in July of 1944, the...race to Baghdad [was] unprecedented in its speed and in the lightness of its casualties."³⁸

Airpower's evolution from overwhelming force to overmatching power facilitated the success of the conventional portion of OIF. The increased reliance on precision-guided munitions jumped from 9 percent in Desert Storm to 70 percent in OIF. The development of these weapons lowered the chances of collateral damage, decreased the amount of munitions needed per target, and increased the range and altitude from which aircrew could release them. This led to fewer sorties needing to be flown to achieve the desired effects, and reduced the amount of friendly and enemy casualties. Finally,

³⁷ Martin Van Creveld, *The Changing Face of War: Lessons of Combat from the Marne to Iraq* (New York: Ballantine Books, 2006), 247-248.

³⁸ Quoted in Gerg Jaffe, "For Military, a Lesson in Speed—Rumsfeld's Vindication Promises to Change Tactics and Deployment of Troops," *Wall Street Journal* (April 10, 2003), A1.

American joint employment proved more efficient than ever before. The fusion of sensors and having JTACs embedded with the land forces paid huge dividends in the speed, precision, and overall situational awareness of the air, land, and maritime forces. For these reasons, the U.S. military was arguably more powerful than ever before. As stated previously, however, with great power that the air forces had achieved, comes great responsibility.

As these innovations increased airpower's ability to attack with discrimination, the political and societal pressures to do so rose concurrently. OIF was more restrictive in its target-approval process than any previous conflict. One of the reasons was the requirement to win the hearts and minds of the Iraqi people for the transition that occurred after the war. Another reason was to ensure that the infrastructure needed for the transition was not destroyed. Finally, the war for perception between the U.S. and Saddam's regime demanded that extreme care be taken to avoid casualties and unnecessary collateral damage. Tighter centralization on the command of execution became the norm for the future beyond OIF and OEF.

The war did have brief instances of interservice competition, but was overall more joint than any previous U.S. conflict. The initial planning concerns and visions by both the air and land component commander for OIF hinted that organizational cultures and bias towards each service's preferred method of conducting operations remained. The atypical extension of the FSCL and the Apache deep-strike-mission debacle was proof that they still existed, even in the wake of Anaconda only two years prior. Cote's idea of interservice competition was still present and explained the USAF's continual innovation towards becoming more precise and standoff-oriented to avoid casualties in these types of conflicts. The Army, meanwhile, eventually recognized the need for as change as well, and adopted a counterinsurgency doctrine and force structure to maintain relevancy in the wars that were to follow the conventional portion of OIF and OEF. Something worth noting is that Rosen's idea of intraservice competition was not a factor for OIF, because during this phase of the campaign, the Iraqi military aligned with the USAF's dominant culture's defined enemy: easily identifiable with strategic targets, and leadership that

could be coerced.³⁹ Furthermore, because of the dissolving of SAC and TAC, all of the “strategic” bombers that once made up SAC were armed with precision munitions that allowed them to do tactical missions such as close air support. The evolution of a standoff, precision munitions, therefore, eliminated the intraservice competition between the fighter and bomber communities. As hinted at previously, this would not remain the case, and the USAF would find itself innovating to meet the challenges of the war’s changing character.

In sum, the success of the three-week conventional campaign was the product of the years of investments made in technology, training, and doctrine. The war, however, did not end with the defeat of Saddam and his regime. Instead, it ushered in a new conflict under the same name but with a different character...a war that the U.S. still finds itself in today.



³⁹ Jeffery J. Smith, *Tomorrow’s Air Force: Tracing the Past, Shaping the Future*, (Bloomington and Indianapolis: Indiana University Press, 2014),142.

Summary and Future Implications

The most important thing that airpower theorists can do today is try to get their perceptions of the future right.

Carl Builder

Drawing on theories of military innovation, this paper has shown that innovation in the USAF is the result of casualty aversion that stems from failures and unacceptable levels of casualties seen in Vietnam. From its inception, airpower advocates have firmly believed that aircraft would make war more humane. The military application of airpower in WWII was defined by the attacking strategic targets that, it was believed, would force the enemy to surrender without having to resort to the horrors of ground warfare as seen in WWI. Coming out of WWII and into Vietnam, the USAF had become a separate and independent service that was dominated by Strategic Air Command, and its strategic/nuclear bomber focus.

As the analysis of the post-Vietnam era showed, both external and internal pressures stimulated by the failures of Vietnam ushered in some of the most significant innovations since WWII. The USAF experience in WWII and Vietnam can best be summarized by the dictum of the military strategist Edward Luttwak, “victory misleads, defeat educates.”¹ When confronted with the strategic challenges of the Vietnam War, USAF leaders attempted to apply strategies that had proven successful in WWII—an industrial targeting strategy against a non-industrial foe. Unfortunately, they failed to recognize the need to adapt to the new strategic realities and were unable to come up with a long-term successful strategy before losing support for the war. The defeat in Vietnam, therefore, weakened the “resistance to change” by “the defenders of the status quo.”² Vietnam was a major point of departure for change in the USAF.

The defeat in Vietnam shook the foundation of the USAF; and, with it, brought about some of the most significant institutional changes in its history. Coming out of Vietnam War, USAF innovations focused on the survival of friendly forces, and limiting collateral damage to avoid casualties in war. This phenomenon is described through Rosen’s theory on military innovation. As USAF innovations began to take place, the

¹ Edward Luttwak, *Strategy: The Logic of War and Peace*. (Cambridge, MA: Belknap Press of Harvard University Press, 1987), 19.

² Luttwak, *Strategy*, 20.

control of Strategic Air Command and the bomber-centric culture began to decline, and the fighter-centric culture became the dominant institutional force. On a macro-level, innovations in the USAF during this period hinted at the transformation of the institution from one defined by mass to precision, because of risk mitigation to Airmen and enemy casualties. As a result, follow-on major U.S. operations from Desert Storm to Iraqi Freedom saw the trend of continual reliance on and development of precision, stealth, and standoff weapons.

Desert Storm was the ideal war for the USAF to test developments made during the post-Vietnam era. After fifteen years of trying to overcome the failures of Vietnam, the USAF found itself in the right war at the right time. Iraq represented a numerically and technologically inferior version of the Soviet Union. Desert Storm seemed to confirm the revolution of airpower as a truly decisive instrument that made the old force-on-force warfare obsolete. Future war, it was believed, would be humane, quick, decisive, and near “bloodless.” Furthermore, Desert Storm also demonstrated that airpower could maintain continued pressure on an enemy, at a safe distance, with increased lethality, and disrupt an enemy’s ability to control its forces. Airpower, it seemed, had finally come of age. Not surprisingly, as American perception of airpower as a low-cost option, with minimal casualties congealed, the level of expectation for it increased. Collateral damage became unacceptable, and U.S. adversaries understood this and adapted their tactics accordingly.

After Desert Storm, the U.S. found itself without a near-peer adversary for the first time in over 50 years. The breakup of the Soviet Union brought about turmoil in many regions, but Yugoslavia fell upon economic and culturally divided times that led to two major conflicts. Political ambiguity clouded these two conflicts. There was very little agreement on the appropriate way to intervene. The conflicts in Bosnia and Kosovo provided an opportunity for the USAF to prove the effectiveness of its innovations since Desert Storm. Specifically, developments in stealth, precision, and standoff capabilities proved their worth in the Balkans, as the pressure to avoid casualties—civilian and military—was higher than ever before. Even with the Serbs adapting to precision by dispersing and blending in with the civilian population, the formula of airpower combined with a small indigenous land force proved too much for the enemy to

overcome. The experience of Deliberate Force and Allied Force seem to reaffirm the idea that airpower could win wars quickly and decisively at a reduced cost. However, a rift between the Army and the Air Force that began at the conclusion of Desert Storm appeared again in the Balkans, and emerged on the battlefields of Afghanistan and Iraq.

In each conflict from Desert Storm to Iraqi Freedom, there have been instances of interservice competition over how each service defined victory. The USAF, for example, came out of Desert Storm believing victory was achieved through simultaneous air attacks on the enemy's centers of gravity. These attacks would cause strategic paralysis and be more efficient and effective than ever before because of innovations in precision, stealth, and standoff capabilities. The USAF, therefore, continued to develop capabilities that further advanced its model for victory. The Army, on the other hand, did not view airpower in the same light, and held the belief that only 'boots on the ground' could win a war. Its belief was partially correct, and the conflicts in Kosovo, Afghanistan, and Iraq all required some sort of land force for success. The land forces, however, were generally small and made up of indigenous and/or small groups of American troops. With the loss of the only near-peer adversary, the large force-on-force vision of victory that the Army had developed during the Cold War was not relevant in the post-Cold War era. It would much later before it would adjust to changes in the strategic environment. For that reason, components of Cote's interservice competition help explain motives for innovation as the USAF and Army continued to have competing views of victory going into the 21st century.

The second major event in this analysis was the attack of 9/11. The terrorist use of airpower fell outside the traditional paradigm of military operations. To say that caught the U.S. and its military by surprise is an understatement. Terrorism went from being a minor nuisance to the major focus of the early 21st century, literally, overnight. In the years that followed, the U.S. traveled great distances to fight the terrorists, and the USAF played a critical role in the campaign to bring down the Taliban and al Qaeda operatives responsible.

The experiences in Afghanistan highlighted several trends in the evolution of airpower up to that point. First, as airpower was becoming more precise, its targets were getting smaller. In the Balkans, the Serbs used dispersal tactics, and the belligerents in

Afghanistan resorted to similar tactics. One of the key differences is that terrorists do not wear uniforms; they look like civilians, making the ability to discriminate between friend and foe from the air much harder. Second, the use of precision-standoff capabilities to avoid casualties continued to increase. Target scrutiny and avoiding casualties, therefore, had become the American way of war, especially in lower-intensity conflicts where the enemy lacked any major military capacity. Third, Operation Anaconda highlighted the growing divide between the Army and the Air Force. In limited wars, where the potential for casualties is higher than the American will to accept, America will rely on airpower as a perceived low-cost option. However, services will continue to find ways to get into “the fight” to demonstrate their ability to contribute to American power projection—arguably, one of the main missions of the American military. For that reason, as long as services have different visions of victory, competition will likely be present. Finally, as the speed and spread of information and communications continues to increase, the control by senior U.S. leadership over the command of execution will continue to remain high. This is especially true if the U.S. continues to find itself fighting in limited wars with limited political objectives where public support depends on favorable perception. This perception, in many cases, relies on low-cost; and, in a conflict, that means minimizing casualties.

Following the success in the conventional portion of Enduring Freedom, the U.S. found itself fighting a second war in Iraq. Unlike Desert Storm, where airpower set the conditions for a land offensive, the conventional portion of Iraqi Freedom was defined by the simultaneous use of coalition air, land, and maritime forces. The combination of continual information surveillance, and reconnaissance (ISR) coverage coupled with an unprecedented number of precision-standoff weapons, integrated with a rapidly advancing ground component, quickly overran the Iraqi resistance with very few casualties. The success against the Iraqi conventional force did not just happen in a vacuum, but was the product of cumulative wartime experience of the U.S. military up to that point.

By the start of Iraqi Freedom, the USAF had evolved from an institution of overwhelming force to overmatching power, through a transformation from mass to precision. An example of this is the increased reliance on precision-guided munitions

from about 9 percent in Desert Storm to nearly 70 percent in Iraqi Freedom. Moreover, the technological and doctrinal innovations over this period lowered the chances of collateral damage, decreased the number of munitions required per target, and increased the range and altitude from which aircrews could release their ordinance. This led to a reduction in the number of sorties needed to neutralize a target, which decreased the chances of casualties. Additionally, the fusion of space, cyber, and unmanned assets enabled standoff and precision capability on a scale never before seen. Instead of the mass bomber formations that defined WWII, the USAF now had the capability to produce effects with a lot fewer aircraft and munitions. The strategic paradox, however, is that as airpower became more precise and produced fewer casualties, the enemy began to use techniques to negate the value of precision. In fact, after the first three weeks of Iraqi Freedom and the first couple of months in Enduring Freedom, the context of each conflict changed to unconventional, asymmetric, and urban warfare. The innovations that were steadily made since the end of Vietnam were quickly overshadowed by the insurgencies that followed the conventional wars in Iraq and Afghanistan. So what implications does this hold for the future of air force innovation? In an irregular warfare environment, will the political and societal requirement to avoid casualties continue to rise?

Future Implications

The evolution of airpower from an instrument of mass to one of precision has several implications for the future. First, the wars in Iraq, the Balkans, and Afghanistan have demonstrated the futility of opposing the U.S. in the traditional interstate paradigm of warfare. After the successful completion of the major combat phase in Iraq and Afghanistan, the U.S. found itself confronted with a form of asymmetric warfare: counter-insurgency. The fight against an ideology—Islamic extremism—versus the traditional state actor, was one of the biggest challenges that emerged in Iraq and Afghanistan. The issue with fighting an ideology is that it cannot be destroyed with military force alone, and the struggle against will incorporate all the instruments of power. For example, one can kill insurgents, but not the idea behind the insurgency without killing many innocent civilians. The use of precision weapons to avoid wanton

killing will continue to be relied upon to avoid casualties in this type of war for the near future.

The second implication is that interservice and intraservice competition will continue to influence the evolution of airpower. First, Cote's theory on interservice competition is seen in the early 21st century as many of the traditional service boundaries are becoming blurred with the development of multi-service technologies in the air, space, and cyberspace domains. For example, each military branch has developed UAVs to support service-specific missions. As noted earlier, since Desert Storm there has been a decrease in American societal threshold for casualties in war. UAVs offer the ultimate low-cost—money and lives—option for warfare. Therefore, UAVs provide a way for each service to get into the fight by substituting a technology for human life. Furthermore, UAVs have made it possible to apply force with maximum lethality, while minimizing both friendly and enemy losses. Interservice competition areas like UAVs will continue and may foster innovation as each service tries to maintain an advantage in its battlespace. Finally, as cyber and space gain more attention as potential warfare domains and focus of government spending, each service may compete in these areas as well.³

As illustrated above, the end of the conventional wars in Iraq and Afghanistan ushered in a change of the strategic environment from interstate war to irregular warfare. Its wake has created an environment where intraservice competition between USAF subcultures over redefining victory in this new environment may take place. Retired Air Force Colonel Jeffery Smith argued that the USAF has gone through two distinct organizational changes, and is in the midst of a possible third, based upon the emergence of subgroups within the USAF that proved themselves vital and paramount to success in war. The bomber community under Strategic Air Command held this banner under the “decisiveness” of nuclear deterrence from the USAF's independence in 1947 until just after the Vietnam War. Then, as alluded to in chapter 1, the Gulf War in 1991 witnessed the “decisiveness” and dominance of fighter operations. The limited wars that the U.S.

³ See Elbridge Colby, “From Sanctuary to Battlefield: A Framework for a U.S. Defense and Deterrence Strategy for Space,” *Center for a New American Security* (January 2016), and insert cyber war reference for potential space and cyber conflict.

has faced since the end of OIF and OEF, however, have opened the door for several other sub-groups to compete for the dominant role in successful USAF operations across the spectrum of war, and not just the conventional aspect.⁴ Many of the characteristics of these communities—UAVs, space, and cyber—emphasize the ability to engage the adversary at longer and safer ranges, therefore, minimizing the potential for casualties.

Finally, airpower will continue to carry the bulk of responsibility for American power projection through the spectrum of conflict because of its demonstrated ability to save lives. That is not to say that airpower can win wars without surface or land forces. On the contrary, as the major conflicts from Desert Storm onward have shown, air forces integrated with some level of surface and/or land forces are key to success. That said, it can be argued that airpower will continue to be the primary instrument called upon to wear down enemy forces, setting the conditions for other friendly-force elements to achieve their objectives with a minimum cost in casualties. The table below is illustrative:

	Army	Air Force	Civilians*
WWII ^a	230,155	88,119**	45,000,000
Korea ^b	29,856	1,238	1,600,000
Vietnam ^c	38,224	2,586	2,000,000
Gulf War ^d	224	35	10,000-12,000
Allied Force ^e	2	0	488-527
Enduring Freedom ^f	1,661	99	26,270
Iraqi Freedom ^g	3,233	52	14,382

Figure 3. Casualties Since WWII

Sources: Table compiled by using casualty tables from the Department of Defense, Defense Casualty Analysis System, as of 26 April, 2017. Civilian information compiled from various sources, see footnotes.

*Civilian casualty numbers vary widely in several sources.

**Army Air Corps numbers was subtracted from Army total.

⁴ See Jeffery J. Smith, *Tomorrow's Air Force: Tracing the Past, Shaping the Future*, (Bloomington and Indianapolis: Indiana University Press, 2014).

- ^a Military casualties were retrieved from Defense Casualty Analysis System. “U.S. Military Casualties – Principal Wars in which the United States Participated – U.S. Military Personnel Serving and Casualties,” *Department of Defense*, April 14, 2017, https://www.dmdc.osd.mil/dcas/pages/report_principal_wars.xhtml. Civilian casualty numbers were retrieved from The National WWII Museum, “WWII by the Numbers: World Wide Deaths,” accessed April 27, 2017, <http://www.nationalww2museum.org/learn/education/for-students/ww2-history/ww2-by-the-numbers/world-wide-deaths.html>.
- ^b Military casualties were retrieved from Defense Casualty Analysis System. “U.S. Military Casualties - Korean War Casualty Summary,” *Department of Defense*, April 14, 2017, https://www.dmdc.osd.mil/dcas/pages/report_korea_sum.xhtml. Civilian casualties numbers were retrieved from CNN Library, “Korean War Fast Facts,” *CNN*, accessed April 14, 2017, <http://www.cnn.com/2013/06/28/world/asia/korean-war-fast-facts/index.html>.
- ^c Military casualties were retrieved from Defense Casualty Analysis System. “U.S. Military Casualties – Vietnam Conflict Casualty Summary,” *Department of Defense*, April 14, 2017, https://www.dmdc.osd.mil/dcas/pages/report_vietnam_sum.xhtml. Civilian casualties numbers were retrieved from Spector, Ronald H, “Vietnam War: 1954-1975,” *Encyclopedia Britannica* (March 9, 2017), accessed April 14, 2017, <https://www.britannica.com/event/Vietnam-War>.
- ^d Military casualties were retrieved from Defense Casualty Analysis System. “U.S. Military Casualties - Persian Gulf War Casualty Summary Desert Shield/Desert Storm,” *Department of Defense*, April 14, 2017, https://www.dmdc.osd.mil/dcas/pages/report_gulf_sum.xhtml. Civilian casualties numbers were retrieved from Keaney, Thomas and Cohen, Eliot, “Gulf War Air Power Survey: Volume 2, Operations and Effects and Effectiveness, Part 1.” (Washington D.C.: Government Printing Office, 1993), 482.
- ^e The only casualties of the war were two warrant officers who died in an Apache training accident. Human Rights Watch concluded that as few as 489 and as many as 589 civilians died in Allied Force reference “The Crisis in Kosovo” *Human Rights Watch*, (2000), accessed 14 April, 2017,
- ^f Military casualties were retrieved from Defense Casualty Analysis System. “U.S. Military Casualties - Operation Enduring Freedom Casualty Summary by Casualty Category.” *Department of Defense*, April 14, 2017, https://www.dmdc.osd.mil/dcas/pages/report_oef_type.xhtml. Civilian casualties numbers were retrieved from Crawford, Neta C., “Costs of War: War-related Death, Injury, and Displacement in Afghanistan and Pakistan 2001-2014,” *Watson Institute for International Studies, Brown University*, (May 22, 2015), <http://watson.brown.edu/costsofwar/files/cow/imce/papers/2015/War%20Related%20Casualties%20Afghanistan%20and%20Pakistan%202001-2014%20FIN.pdf>.
- ^g Military casualties were retrieved from Defense Casualty Analysis System. “U.S. Military Casualties - Operation Iraqi Freedom Casualty Summary by Casualty Category.” *Department of Defense*, April 14, 2017, https://www.dmdc.osd.mil/dcas/pages/report_oif_type.xhtml, Civilian casualties numbers were retrieved from “Documented Civilian Deaths from Violence,” *Iraq Body Count*, accessed 14 April 2017, <https://www.iraqbodycount.org/database/>.

In an era where the U.S. finds itself in limited wars that are widely unpopular, airpower has become the nation's weapon of choice when it wants to wield influence in the international arena because of casualty aversion. The recent political trend that popular support declines as casualties increase in war cannot be ignored. From WWII to Iraqi Freedom, the number of casualties has steadily decreased (see Figure 3.), while the U.S. reliance on airpower has increased. The U.S., therefore, depends on airpower as its primary means to project power to avoid the considerable number of casualties that result from employing a conventional land force. Casualty aversion, simultaneously, acts as the Air Force's means of self-preservation, and continues to provide the incentive for innovation in the institution. Outside of a Pearl Harbor or 9/11 type of crisis, where the public is naturally incited, the U.S. will continue to rely on airpower's unique gift of minimizing casualties to exert its international influence for the foreseeable future.

As this analysis has shown, the evolution of airpower capabilities that have increased the range from which Airmen can safely engage the enemy, and the ability to do it with a high-level of discrimination have altered the way the U.S. goes to war. However, as the instrument of airpower has proven the ability to reduce casualties, the political and societal requirement to do so has increased. Additionally, the strategic dilemma is that as precision increased to avoid casualties, the enemy began to adapt in an attempt to produce more casualties. As the U.S. finds itself in more conflicts that fall somewhere between absolute war and peace, the requirement to avoid casualties and ability to do so will continue to be a challenge and will stimulate innovation.

Bibliography

- Air Force Doctrine Document 2. "Organization and Employment of Aerospace Power." USAF, September 28, 1998.
- Air Vice Marshal R.A. Mason, RAF. *War in the Third Dimension: Essays in Contemporary Air Power*. London: Brassey, 1986.
- Alan Vick, David Orletsky, Abram N. Shulsky, and John Stillion. "Preparing the U.S. Air Force for Military Operations Other Than War." Santa Monica, CA: RAND, 1997.
- Amy Svitak. "Force of the Future." *Army Times*, November 25, 2002.
- Army Field Manual 1-112. "Attack Helicopter Operations." Headquarters, Department of the Army, April 2, 1997.
- Baron De Jomini. *The Art of War*. Radford, VA: Wilder Publications, 2008.
- Barry Posen. *The Sources of Military Doctrine: France, Britain, and Germany Between The World Wars*. Ithaca, NY: Cornell University Press, 1984.
- Benjamin S. Lambeth. *Air Power Against Terror: America's Conduct of Operation Enduring Freedom*. Santa Monica, CA: RAND, 2005.
- . *NATO's Air War for Kosovo: A Strategic and Operational Assessment*. Santa Monica, CA: RAND, 2001.
- . *The Transformation of American Airpower*. Ithaca, NY: Columbia University Press, 2000.
- . *The Unseen War: Allied Air Power and the Takedown of Saddam Hussein*. Annapolis, MD: Naval Institute Press, 2013.
- Bruce D. Berkowitz. *The New Face of War: How War Will Be Fought in the 21st Century*. New York: Free Press, 2003.
- Bruce R. Nardulli et al. *Disjointed War: Military Operations in Kosovo 1999*. Santa Monica, CA: RAND, 2002.
- Campbell Craig. *Destroying the Village: Eisenhower and Thermonuclear War*. New York: Columbia University Press, 1998.
- Carl Von Clausewitz, Michael Howard, and Peter Paret. *On War*. Princeton, NJ: Princeton University Press, 1976.
- Chris Hodson. *Vietnam Air Losses United States Air Force, Navy and Marine Corps Fixed-Wing Aircraft Losses in Southeast Asia 1961-1973*. Hinckley, England: Midland, 2001.
- CNN Library, "Korean War Fast Facts," CNN, accessed April 14, 2017, https://www.dmdc.osd.mil/dcas/pages/report_korea_sum.xhtml.
- Dale Eisman. "Over the Balkans, Its Beauty vs. the Beast." *Norfolk Virginian-Pilot*, April 26, 1999.
- Dan Balz. "U.S. Strikes Again at Afghan Targets: American Told to Be Alert to Attacks." *Washington Post*, October 9, 2001.

- David A. Deptula. "Effects-Based Operations: Change in the Nature of Warfare." *Aerospace Education Foundation*, 2001.
- Defense Casualty Analysis System. "U.S. Military Casualties - Operation Enduring Freedom Casualty Summary by Month and Service." Department of Defense, April 14, 2017.
- "U.S. Military Casualties – Principal Wars in which the United States Participated – U.S. Military Personnel Serving and Casualties," *Department of Defense*, April 14, 2017.
- "U.S. Military Casualties - Korean War Casualty Summary," *Department of Defense*, April 14, 2017.
- "U.S. Military Casualties – Vietnam Conflict Casualty Summary," *Department of Defense*, April 14, 2017.
- "U.S. Military Casualties - Persian Gulf War Casualty Summary Desert Shield/Desert Storm," *Department of Defense*, April 14, 2017.
- "U.S. Military Casualties - Operation Enduring Freedom Casualty Summary by Month and Service." Department of Defense, April 14, 2017.
- "U.S. Military Casualties - Operation Enduring Freedom Casualty Summary by Casualty Category." *Department of Defense*, April 14.
- "Documented Civilian Deaths from Violence," *Iraq Body Count*, accessed 14 April 2017, <https://www.iraqbodycount.org/database/>.
- Donald B. Rice. *The Air Force and U.S. National Security: Global Reach-Global Power*. Office of the Secretary of the Air Force, 1991.
- Edward Kaplan. *To Kill Nations: American Strategy in the Air-Atomic Age and the Rise of Mutually Assured Destruction*. Ithaca, NY: Cornell University, 2015.
- Edward Luttwak. *Strategy: The Logic of War and Peace*. Cambridge, MA: Belknap Press of Harvard University Press, 1987.
- Evan Thomas, and Martha Brandt. "The Secret War." *Time*, April 1, 2003.
- Gary C. Schroen. *First in: An Insider's Account of How the CIA Spearheaded the War in Terror in Afghanistan*. New York: Ballentine, 2005.
- General T.R. Milton, USAF (Ret.). "USAF and the Vietnam Experience." *Air Force Magazine*, June 1975.
- George Friedman. *America's Secret War: Inside the Hidden Worldwide Struggle Between American and Its Enemies*. New York: Broadway, 2004.
- Greg Jaffe. "For Military, a Lesson in Speed--Rumsfeld's Vindication Promises to Change Tactics and Deployment of Troops." *Wall Street Journal*, April 10, 2003.
- Graham Allison, and Philip Zelikow. *Essence of a Decision: Explaining the Cuban Missile Crisis*. New York: Longman, 1999.
- Jeffery J. Smith. *Tomorrow's Air Force: Tracing the Past, Shaping the Future*. Bloomington and Indianapolis: Indiana University Press, 2014.
- John A. Warden III. "The Enemy as a System." *Airpower Journal*, no. Spring (1995): 41–50.
- John Andreas Olsen. *A History of Air Warfare*. Washington, D.C.: Potomac Books, 2010.
- Airpower Reborn: The Strategic Concepts of John Warden and John Boyd*. Annapolis, MD: Naval Institute Press, 2015.
- Global Air Power*. Washington, D.C.: Potomac Books, 2011.
- John Keegan. *The Iraq War*. New York: A.A. Knopf, 2004.
- John Pomfret. "Kandahar Bombs Hit Their Mark." *Washington Post*, December 10, 2001.
- John Schlight. *The War in South Vietnam: The Years of the Offensive 1965-1968*. Washington, D.C.: Office of Air Force History, U.S. Air Force, 1988.

- Joint Chiefs of Staff. *Doctrine for Joint Operations, Joint Publication 3-0*. Washington, D.C.: Department of Defense, September 10, 2001.
- Keith Shimko. *The Iraq Wars and America's Military Revolution*. New York, NY: Cambridge University Press, 2010.
- "Lessons Learned" During Operation Enduring Freedom in Afghanistan and Operation Iraqi Freedom, and Ongoing Operations in the United States Central Command Region, § Committee on Armed Services United States Senate (2003).
- Neta C. Crawford, "Costs of War: War-related Death, Injury, and Displacement in Afghanistan and Pakistan 2001-2014," *Watson Institute for International Studies, Brown University*, (May 22, 2015), <http://watson.brown.edu/costsofwar/files/cow/imce/papers/2015/War%20Related%20Casualties%20Afghanistan%20and%20Pakistan%202001-2014%20FIN.pdf>
- Major Mark G. Davis. "Operation Anaconda: Command and Confusion in Joint Warfare." Master's thesis, School of Advanced Air and Space Studies, 2004.
- Mark Clodfelter. *Beneficial Bombing*. Lincoln, NE: University of Nebraska Press, 2010.
- . *The Limits of Air Power: The American Bombing of North Vietnam*. Lincoln, NE: University of Nebraska Press, 2006.
- Mark Mazzetti. *The Way of the Knife: The CIA, a Secret Army, and a War at the End of the Earth*. New York, NY: Penguin, 2014.
- Marshall L. Michel III. *Clashes: Air Combat over North Vietnam 1965-1972*. Annapolis, MD: Naval Institute Press, 2007.
- . *The Eleven Days of Christmas: America's Last Vietnam Battle*. San Francisco, CA: Encounter Books, 2002.
- Martin Van Creveld. *The Changing Face of War: Lessons of Combat from the Marne to Iraq*. New York: Ballentine Books, 2006.
- Max Boot. *War Made New: Technology, Warfare, and the Course of History, 1500 to Today*. New York: Gotham Books, 2006.
- Michael Grunwald. "Terrorist Hijack Four Airliners, Destroy World Trade Center, Hit Pentagon: Hundreds Dead." *Washington Post*, September 12, 2001.
- Michael Knights. *Cradle of Conflict: Iraq and the Birth of Modern U.S. Military Power*. Annapolis, MD: Naval Institute Press, 2005.
- Michael R. Gordon. "Tightening a Noose." *New York Times*, April 4, 2003.
- "Operation Allied Force: Day One," *CNN*, March 25, 1999.
- Owen R. Cote, "The Politics of Innovative Military Doctrine: The U.S. Navy and Fleet Ballistic Missiles," Thesis (Ph. D.)--Massachusetts Institute of Technology, 1996.
- Paul Richter. "B-2 Drops Its Bad PR in Air War." *Los Angeles Times*, July 8, 1999.
- "Report on the Activities of the Committee on Armed Services United States Senate." Washington, D.C.: U.S. Government Printing Office, October 21, 1999.
- Richard B. Andres, Craig Willis, and Thomas E. Griffith. "Winning with Allies: The Strategic Value of the Afghan Model" 30, no. 3 (Winter /2006 2005).
- Richard G. Davis. *Decisive Force: Strategic Bombing and the Gulf War*. Washington, D.C.: Air Force History and Museum Program, 1996.
- Richard Hallion. *Storm Over Iraq: Air Power and the Gulf War*. Washington, D.C.: Smithsonian Institution Press, 1992.
- Robert Coram. *Boyd: The Fighter Pilot Who Changed the Art of War*. New York: Back Bay Books, 2002.

- Ronald H. Spector, "Vietnam War: 1954-1975," *Encyclopedia Britannica* (March 9, 2017), accessed April 14, 2017, <https://www.britannica.com/event/Vietnam-War>.
- Secretary of Defense William J. Perry. "Annual Report to the President and the Congress." Washington, D.C.: Government Printing Office, March 1996.
- Secretary of the Air Force. *Counterland Operations, Air Force Doctrine Document 2-1.3*. Maxwell Air Force Base, AL: Air Force Doctrine Center, 2006.
- Stephen Budiansky. *Air Power: The Men, Machines, and Ideas That Revolutionized War, from Kitty Hawk to Iraq*. New York, NY: Penguin Books, 2005.
- Stephen Peter Rosen. *Winning The Next War: Innovation and The Modern Military*. Ithaca, NY: Cornell University Press, 1991.
- Steve Vogel. "Over Afghanistan, Gantlets in the Sky." *Washington Post*, October 29, 2001.
- Susan Page. "War May Realign World and Define a Presidency." *USA Today*, March 17, 2003.
- "The Crisis in Kosovo" *Human Rights Watch*, (2000), accessed 14 April, 2017,
- Thomas G. Mahnken. *Technology and the American Way of War Since 1945*. New York: Columbia University Press, 2008.
- Thomas Keaney, and Eliot Cohen. "Gulf War Air Power Survey Summary Report." Government Printing Office, 1993.
- ". "Gulf War Air Power Survey: Volume 2, Operations and Effects and Effectiveness, Part 1." Government Printing Office, 1993.
- Tom Clancey, and Chuck Horner. *Every Man a Tiger: The Gulf War Air Campaign*. New York: Berkley, 2000.
- Tony Capaccio. "Air Force Used Vintage Aardvarks to 'Plink' Tanks." *Defense Week*, March 4, 1991.
- U.S. Air Force. *Air War--Vietnam*. Indianapolis; New York: Bobbs-Merrill, 1978.
- U.S. National Archives. "Statistical Information about Casualties of the Vietnam War." Accessed February 2, 2017. <https://www.archives.gov/research/military/vietnam-war/casualty-statistics.html#page-header>.
- Wayne W. Thompson. "Al Firdos: The Last Two Weeks of Strategic Bombing in DESERT STORM." *Air Power History*, 1996.
- Wesley K. Clark. *Waging Modern War: Bosnia, Kosovo, and the Future of Combat*. New York: Public Affairs, 2001.
- Testimony before U.S. Senate Armed Services Committee, October 21, 1999.
- William Branigin, and Doug Struck. "U.S. Intensifies Bombing." *Washington Post*, November 1, 2001.
- Williamson Murray, and Robert H. Scales. *The Iraq War: A Military History*. Cambridge, MA: Belknap Press of Harvard University Press, 2003.
- The National WWII Museum, "WWII By the Numbers: World Wide Deaths," accessed April 27, 2017, <http://www.nationalww2museum.org/learn/education/for-students/ww2-history/ww2-by-the-numbers/world-wide-deaths.html>.